

THE SPOOKPLANES OF AREA 51

# AIR & SPACE

Smithsonian

**MYSTERIES**  
*of* **AVIATION**

**SECRETS**  
*of* **SPACE**

**5 CRASHES**

No One Can Solve

Bureau of UFO  
Investigation

Superstitions  
Pilots Swear By

**THE SPACE  
SHUTTLE ATE  
MY WATCH**

(and other tales  
of the weird)

The 727 That  
Vanished

What Really Happened  
to Yuri Gagarin?

SEPTEMBER 2010





## Features

### 16 The Truth Is Out There

BY WILLIAM B. SCOTT

...but in the isolated corner of Nevada known as Area 51, only a few have seen it fly. And they aren't talking.

### 22 Lost in Space

BY TOM JONES

All those socks your dryer has been stealing? They might be on the International Space Station.

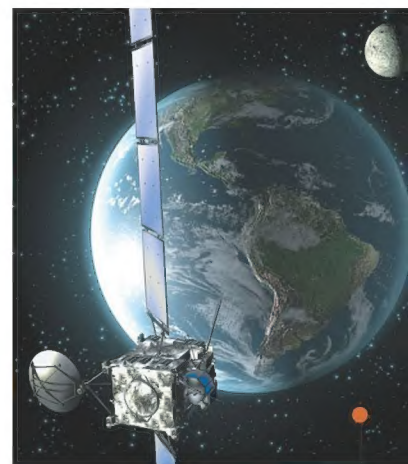
### 24 Cold Case

BY MICHAEL BEHAR

Some airplane crash sites remain hidden for years. Now a volunteer team of investigators is hunting them down.

## Departments

- |                   |                         |
|-------------------|-------------------------|
| 2 Viewport        | 70 Reviews & Previews   |
| 3 Letters         | 74 Credits              |
| 8 In the Museum   | 75 Forecast             |
| 12 Above & Beyond | 76 Moments & Milestones |
| 14 Interview      |                         |
| 68 Then & Now     |                         |



### 38 The Curse of the Cargomaster

BY JOHN SOTHAM

PHOTOGRAPHS BY MARK DUEHMIG

The first U.S. strategic airlifter fell victim to perplexing behaviors that are still not fully understood.

### 46 The Force Is With Them

BY SAM KEAN

When spacecraft swing past Earth, something besides gravity takes the controls.

### Share Online What You Read In Print

Reading *Air & Space* on the go and want to share an article right away with your friends? Type the link you'll see at the bottom of the page into your mobile phone or computer, and send your friends the page through Facebook, Twitter, or e-mail.



Share this article at [as.hy.pr/](http://as.hy.pr/)







## What Is the *Real* Story behind Christianity's Formative Years?

Explore the surprising development of early Christianity as it transformed from the religion *of* Jesus to a religion *about* Jesus. **From Jesus to Constantine: A History of Early Christianity** shows you how the form of Christianity we know today emerged only after many years of transition and conflict. In 24 engaging lectures that will increase your understanding of Christianity, you discover how a single group from among many “lost Christianities” won the struggle for dominance, established its beliefs as central to the faith, rewrote the history of Christianity’s internal conflicts, and produced a canon of sacred texts—the New Testament—to support its own views.

Bestselling author and award-winning Professor Bart D. Ehrman, Chair of the Department of Religion at The University of North Carolina, Chapel Hill, offers you a scholar’s perspective on the origins of what he calls the most important institution in Western civilization.

This course is one of The Great Courses®, a noncredit recorded college lecture series from The Teaching Company®. Award-winning professors of a wide array of subjects in the sciences and the liberal arts have made more than 300 college-level courses that are available now on our website.

*Order Today!*  
*Offer expires Tuesday, November 9, 2010*

### From Jesus to Constantine: A History of Early Christianity

Taught by Professor Bart D. Ehrman,  
The University of North Carolina at Chapel Hill

#### Lecture Titles

- |  |  |
|--|--|
| 1. The Birth of Christianity                   | 13. Christian Reactions to Persecution           |
| 2. The Religious World of Early Christianity   | 14. The Early Christian Apologists               |
| 3. The Historical Jesus                        | 15. The Diversity of Early Christian Communities |
| 4. Oral and Written Traditions about Jesus     | 16. Christianities of the Second Century         |
| 5. The Apostle Paul                            | 17. The Role of Pseudepigrapha                   |
| 6. The Beginning of Jewish-Christian Relations | 18. The Victory of the Proto-Orthodox            |
| 7. The Anti-Jewish Use of the Old Testament    | 19. The New Testament Canon                      |
| 8. The Rise of Christian Anti-Judaism          | 20. The Development of Church Offices            |
| 9. The Early Christian Mission                 | 21. The Rise of Christian Liturgy                |
| 10. The Christianization of the Roman Empire   | 22. The Beginnings of Normative Theology         |
| 11. The Early Persecutions of the State        | 23. The Doctrine of the Trinity                  |
| 12. The Causes of Christian Persecution        | 24. Christianity and the Conquest of Empire      |

From Jesus to Constantine: A History of Early Christianity  
Course No. 6577  
24 lectures (30 minutes/lecture)

DVDs ~~\$254.95~~ **NOW \$69.95**  
+ \$10 Shipping, Processing, and Lifetime Satisfaction Guarantee

Audio CDs ~~\$179.95~~ **NOW \$49.95**  
+ \$10 Shipping, Processing, and Lifetime Satisfaction Guarantee

Priority Code: 40295

**1-800-TEACH-12**  
**www.TEACH12.com/2sas**

*ACT NOW!*



THE TEACHING COMPANY®  
*The Joy of Lifelong Learning Every Day™*  
GREAT PROFESSORS, GREAT COURSES, GREAT VALUE  
GUARANTEED.™



"As the master craftsman who opened the famous Lincoln Pocket Watch in Washington, D.C., I recently reviewed the Stauer Meisterzeit timepiece. The assembly and the precision of the mechanical movement are the best in its class."

—George Thomas  
Towson Watch Company



## We Can Only Find One

*A rare chance to claim a unique piece of watchmaking history for under \$100!*

Eighty-six years ago, a watchmaker in Paris famous for building the magnificent clocks at Versailles created a legendary timepiece. He invented the first watch with an automatic mechanical drive. These innovative movements required no batteries and never needed to be manually wound. Only seven of these ultra-rare watches were ever made and we've studied the one surviving masterpiece in a watch history museum. Inspired by history, classic design and technology, our Stauer *Meisterzeit* has been painstakingly handcrafted to meet the demanding standards of vintage watch collectors.

**Why the new "antique" is better than the original.** The original timepiece was truly innovative, but, as we studied it closely, we realized that we could engineer ours with a much higher level of precision. The 27-ruby-jewel movement utilizes an automatic self-winding mechanism inspired by a patent from 1923, but built on \$31 million in state-of-the-art Swiss-made machinery. With an exhibition back, you can see into the heart of the engineering and view the rotor spin—it's powered by the movement of your body.

This limited edition Stauer *Meisterzeit* allows you to wear a watch far more exclusive than most new "upscale" models. Here is your chance to claim a piece of watchmaking history in a rare design that is priced to wear everyday.

**Elegant and accurate.** This refined beauty has a fastidious side. Each movement and engine-turned rotor is tested for 15 days and then certified before it leaves the factory.

The best part is that with our special price, you can wear a superb classic historical reproduction watch and laugh all the way to the bank. Stauer specializes in classic timeless watches and jewelry that are made for the millionaires who want to keep their millions. This watch will quickly move to heirloom status in your household.



View the precision movement of the *Meisterzeit* through the rear exhibition port.

Try it for 30 days and if you are not thrilled with the beauty and construction of the *Meisterzeit*, simply return it for a refund of the purchase price.

**Extremely limited availability.** Since it takes about 6 months to build each watch, the release is a limited edition, so please be sure to order yours soon.

#### WATCH SPECS:

- 14K Gold-clad case and bezel
- Precision 27-jeweled movement
- Interior dials display day and month
- Croc-embossed leather strap
- Fits 6 3/4"-8 1/4" wrist

**76% OFF**

*Exclusively Through Stauer*

Stauer Meisterzeit Watch—~~\$395~~  
**Now only \$95 +S&P Save \$300!**

Call now to take advantage of this limited offer.

**1-888-324-4351**

Promotional Code MZW316-02  
Please mention this code when you call.

**Stauer**

14101 Southcross Drive W.,  
Dept. MZW316-02  
Burnsville, Minnesota 55337  
[www.stauer.com](http://www.stauer.com)

*Smart Luxuries—Surprising Prices*



# AIR & SPACE

Smithsonian



## ON THE COVER

Photographer Gábor Kovács Dödi caught a Tupolev Tu-154 taking off from Budapest one foggy morning when the sun added an eerie glow to the clouds. We added the star trails photographed by Joshua Bury and the halo effect.



## 30 Department of Flying Saucers

BY CRAIG MELLOW

Bureaucrats tasked with following up UFO reports find coincidences between sightings and Hollywood film releases.

## 36 Missing Persons File

We update the searches for Charles Nungesser, François Coli, and all the usual suspects.



## 47 What Made Yuri Fall?

BY ANDREW OSBORN

The cause of the crash that killed Russian cosmonaut Yuri Gagarin is a riddle, wrapped in a mystery, inside an enigma.

## 48 The 727 That Vanished

BY TIM WRIGHT

One more intrigue that seemed to have 9/11 written all over it.

## 54 The Curious Case of Edgar Mix

BY REBECCA MAKSEL

Just as lighter-than-air flight was giving way to the airplane, a champion balloonist died mysteriously. Was it suicide or murder?

## 58 Cause Unknown

BY LESTER A. REINGOLD

Five airplane crashes the experts still can't explain.

## 62 One More for the Checklist

BY MICHAEL KLESIOUS

A survey of the good luck charms pilots have relied on to bring them home.

## 65 Case Closed

We have answers to some of the most puzzling questions in aviation and spaceflight.



<b>Editor</b>	Linda Musser Shiner
<b>Art Director</b>	Ted Lopez
<b>Executive Editor</b>	Paul Hoversten
<b>Senior Editors</b>	Tony Reichhardt Patricia Trenner
<b>Senior Associate Editor</b>	Perry Turner
<b>Associate Editors</b>	Michael Klesius Rebecca Maksel Diane Tedeschi
<b>Photography and Illustrations Editor</b>	Caroline Sheen
<b>Researcher</b>	Roger A. Mola
<b>Editorial Intern</b>	Mary McKillop
<b>Founding Editor</b>	George C. Larson

## CONTRIBUTING EDITORS

Roger Bilstein	W. David Lewis
William E. Burrows	Eric Long
Tom Crouch	Stephen Maran
David DeVorkin	Laurence Marschall
Freeman Dyson	Ted Maxwell
Daniel Ford	Marshall Michel
Greg Freiherr	Ron Miller
William Gregory	Brian Nicklas
Dan Hagedorn	James Oberg
R. Cargill Hall	Dominick Pisano
Richard Hallion	George Robinson
Jim Hansen	Chad Slattery
Gregg Herken	Marcia Smith
Nick Komons	Stephan Wilkinson

**Editorial:** (202) 633-6070  
**e-mail:** editors@si.edu  
**Web site:** [airspacemag.com](http://airspacemag.com)

*Air & Space/Smithsonian*; September 2010; Vol. 25, No. 4

*Air & Space/Smithsonian's* September 2010 issue is an extra issue. Subscribers will still receive 6 or 12 issues as part of their paid subscriptions; however, membership expiration dates may move. *AIR & SPACE/Smithsonian* (ISSN 0886-2257) is published bimonthly by Smithsonian Enterprises, MRC 513, PO Box 37012, Washington, DC 20013-7012. We may occasionally publish extra issues. Periodical postage paid at Washington, DC, and additional mailing offices.

**POSTMASTER:** Send change of address to *AIR & SPACE/Smithsonian*, PO Box 62080, Tampa, FL 33662-0808. Printed in the USA. Canadian publication agreement no. 40039324. Canadian return address: Brokers Worldwide, PO Box 1051, Fort Erie, ON L2A 6C7 Canada.

©Smithsonian Institution 2010. All rights reserved. Reproduction in whole or in part without permission is prohibited. Editorial offices: MRC 513, PO Box 37012, Washington, DC 20013. Circulation and advertising offices: 420 Lexington Ave., New York, NY 10170.

**SUBSCRIPTIONS:** U.S. and possessions: \$26 a year payable in U.S. funds. Canada and all other countries: add \$6.00 (U.S. funds) per year. Ninety-nine percent of dues is designated for magazine subscription. Address changes and subscription orders: Mail to *AIR & SPACE/Smithsonian*, PO Box 62080, Tampa, FL 33662-0808; call (800) 513-3081; outside the U.S., call (813) 910-3609.

**MAILING LISTS:** We sometimes make our subscriber list available to companies that sell goods and services that we believe would interest our readers. If you do not want to receive such mailings, send your current mailing label or, an exact copy, to: *AIR & SPACE/Smithsonian*, Mail Preference Service, PO Box 62080, Tampa, FL 33662-0808.

**SINGLE COPIES:** To purchase an issue (current \$4.99, back issue \$7), please write *AIR & SPACE/Smithsonian*, 420 Lexington Ave., Suite 2335, New York, NY 10170, or call (212) 916-1300.

## Conquering the Unknown

**ALMOST EVERY OBJECT** in the National Air and Space Museum represents a first step into unknown territory: the first airplane, the first aircraft to fly faster than sound, the first spacecraft to carry astronauts to the moon and back. Through scientific inquiry and patient engineering, all of them transformed mystery into history. But this special issue of *Air & Space* is dedicated to mysteries that haven't been solved, and these pages offer many intriguing puzzles.

Confronting the unknown is a universal human experience; we all do things for the first time. When I was a brand-new lieutenant flying transports, the instructors loved to put us in situations that would test us. I was lucky enough to have joined the Marine Corps at a time when many of the instructors were enlisted men who had been trained as pilots during the build-up to World War II. The Navy called them Naval Aviation Pilots, or NAPs. Most had years of combat experience.

The instructors had the same kind of practical approach to problem-solving described in the piece on the C-133 Cargomaster (p. 38). I got a kick out of reading about the loadmasters' shortcuts; we had a few of our own. When the tricycle-gear Douglas R5D (in civilian life, the DC-4) was loaded, the back end would sink, so the airplane came with a vertical bar to prop up the tail. Our criterion for determining whether the load put the center of gravity in the right place was that with two engines running at 1,000 rpm, the crew chief could remove the

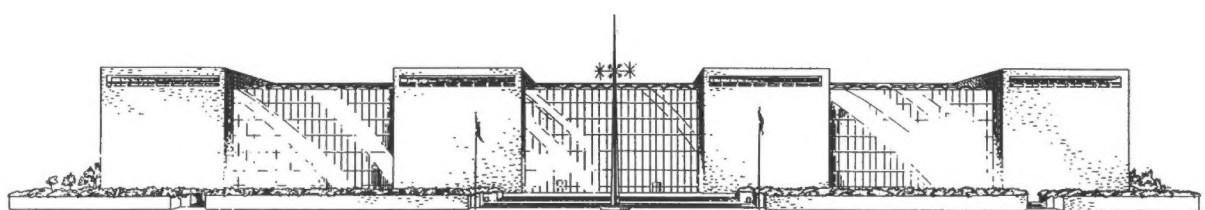
tail bar without having to knock it out with a wheel chock. I remember times when I'd hear the crew chief back there banging and banging on that tail bar.

One thing I learned from the NAPs was that if you got yourself into a situation, you were the one who had to get yourself out. When I was stationed in Cherry Point, North Carolina, I flew the R4Q, better known as the C-119 Flying Boxcar. We could parachute supplies through a pair of doors in the belly, called paratainer doors.

I know for a fact that you can get 24 cases of whiskey in the space between the paratainer doors and the floor boards. One year for the Marine Corps Birthday Ball, our squadron was sent to get refreshments. Back from the shopping trip, we landed on a runway covered with five inches of snow, and the paratainer doors broke open. My job was to figure out how to get the refreshments off the runway. Since no guidelines existed for this activity, I was glad the NAPs had taught me to think on my feet. Luckily, it was a Saturday night with no traffic, and I managed to get all the boxes in the Follow Me truck. The mystery was how many of those bottles were unbroken. We had a very fine Birthday Ball.

Having gone through the Marine Corps training at Quantico and then joining my first squadron with the NAPs, I learned that life will toss you a few mysteries, and that the best way to accomplish a goal or figure out what's important isn't always "by the book."

■ ■ ■ J.R. DAILEY IS THE DIRECTOR OF THE NATIONAL AIR AND SPACE MUSEUM.





## A WASP Pierced His Ego

"Belated Accolades" (Soundings, June/July 2010) made me recall an incident from my days as a Navy pilot. At the time, I was a primary instructor in Stearmans. My squadron commanding officer tapped me to ferry an SNJ (AT-6) from my base at Olathe, Kansas, to Austin, Texas. I thought I was hot stuff.

After I landed at the Army Air Forces base at Austin, Texas, and taxied up to the line to park and shut down, I opened the cockpit and sat there basking in the glow of my feat. Perhaps waiting for a Command car to come escort me into flight ops.

As I sat there, an AT-6 pulled up and parked beside me. Canopy opened, and a small red-headed woman stood up in the cockpit, waved at me, jumped down, and headed for ops. It took a while for my ego to deflate. Finally I mustered enough courage to go to ops, and sign in below her. I have forgotten her name, but I will never forget that wave.

Howie Keefe  
Mulberry, Florida

## Don't Skim This Warning

I'm sure the picture of the AT-6 Harvards skimming across the lake on their tires (Sightings, Aug. 2010) will inspire a few daredevils to imitate the trick, just as the pilot in the photo was inspired by a story he'd heard.

Any pilot interested in the trick should be aware of one life-or-death distinction: Water-skimming should be attempted only in a tailwheel aircraft. A taildragger's main wheels are in front of its center of lift, so an upward bump on the wheels—from a runway or a lake—tends to raise the nose and increase lift. (That's why the lake-skimming pilots had to maintain forward stick pressure.)

In nosewheel aircraft, on the other hand, the main wheels are behind the center of lift, so when the aircraft

bump down, the nose immediately drops and the lift decreases. This trait makes the aircraft easy to land on a runway, but potentially deadly if used for lake-skimming.

David Noland  
Mountainville, New York

## Life After the Military

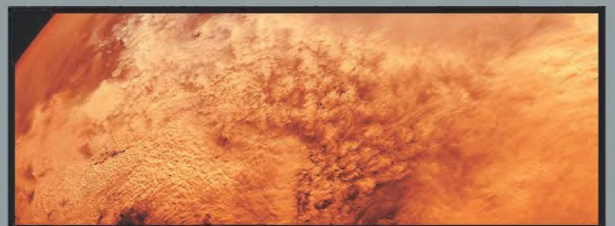
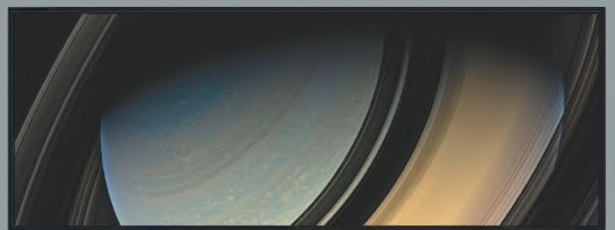
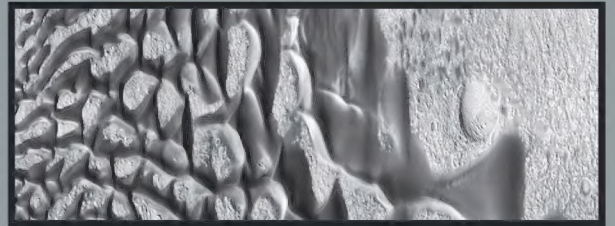
I can add more to the story of the last B-36 ("Monster Bomber," Aug. 2010). At the end of its career, the aircraft landed at Fort Worth's Great Southwest Airport; later, it was moved to an open lot. In the early 1990s, after the aircraft had been deteriorating for years, General Dynamics provided hangar space for the bomber to be disassembled, and a crew of mostly retired employees volunteered to restore it. Most of the upper fuselage skin and large portions of the wing skins were replaced with aluminum, since magnesium sheet is no longer available.

I have a particular fondness for the picture of the inlets on pages 40-41. Over the years the lips trapped water, which corroded the inlets from the inside out. In 1995, I spent 10 Saturdays hand-forming new lip pieces from soft aluminum and replacing the corroded parts. One of the original pieces now graces the wall of my workshop.

Many members of the B-36 Association, who had spent so many hours restoring the ship, were heartbroken to see it trucked away to the Pima museum in Arizona, but it is good to see the last Peacemaker back together.

Kevin Renshaw  
Fort Worth, Texas

A few of On Mark Engineering's B-26 conversions ("Truck Killer," June/July 2010) were built as pressurized business-style planes. One was used by NASA for Wernher von Braun. The University of Nevada's Desert Research Institute in Reno acquired this bird, N4204A, about 1968 and equipped it



VISIT THE **AIR & SPACE** WEB SITE to see awe-inspiring photographs of **the planets**. Our slideshow

"From Beyond" features a selection from the images that have been sent to Earth by planetary probes Mariner, Viking, Voyager, and Cassini.

Also look through a gallery of rare warbirds from the **California Planes of Fame airshow** in "History in Flight," photos of the *Enola Gay* by National Air and Space Museum photographers Eric Long and Mark Avino, and striking images from "NASA Art on Tour," a traveling exhibition from the space agency's right brain.

Keep informed of the events and anniversaries in aviation and spaceflight by reading our blog, **The Daily Planet**.

Four details of planets from Michael Benson's *Beyond*, an exhibit at the National Air and Space Museum.



with instruments for weather research missions. We had sensors mounted in the long baggage compartment in the nose, and others in converted fuel pods attached to the wings outboard of the engines. The sturdy airframe and large engines, R-2800s as I recall, enabled thorough sampling of airflow in lenticular clouds and winter storms over the Sierra Nevada mountains.

One quirk was the laminar wing, which was sensitive to ice accumulation. On a March 2, 1980 flight, a delay in the response to ice buildup apparently led to a catastrophic stall and crash. The pilot, copilot, and two scientists died; another scientist just missed the departure.

Paul Fransioli  
Las Vegas, Nevada

## Crisp Rolls? Check

While the Airline Quality Rating is still an important indicator of airline importance, it is probably time for Professors Bowen and Headley to update some of the methodology they use in it ("How Good Is Your Airline?" Apr./May 2010).

The rating is based in large part on complaints to the federal government, and the amount of overbooking, which leads to passengers being bumped. But the bread and butter of most carriers are savvy, high-yield business passengers, who are unlikely to be bumped and

who are even less likely to write to the government to complain than occasional leisure travelers.

In addition, low-cost, high-frequency airlines such as Hawaiian and Southwest are essentially in a different business from the full-service, long-distance carriers. Customers of airlines flying one-hour legs have different expectations from those of full-service carriers flying trans-continental and intercontinental routes. The latter carriers have to compete with some of the world's most celebrated international airlines.

The story reports that "Bowen and Headley take zero interest in flight attendants' smiles or the crispness of the rolls," but at a time when airlines are maximizing revenue through additional fees and minimizing passenger services, such perceptual feedback is crucial, and ignored at the airlines' peril.

David Rimmer  
Knightsbridge Worldwide  
Port Washington, New York

## The Low-Down on Dale

I had the pleasure of announcing/narrating every flight of the Grumman Cats from the first one until about 1991. Yes, Dale Snodgrass was always amazing ("The Real Top Gun," June/July 2010).

At a Kalamazoo, Michigan airshow in 1990, I had a film crew in to shoot the story of the Flight of the Grumman Cats. When Snort took off, he cranked the F-14 around so low and so tight that in the film, wingtip vortices are plainly visible in the dirt next to the runway.

Frank Kingston Smith  
via [airspacemag.com](http://airspacemag.com)

## Can All Engines Fail?

"Old Faithful" (Moments & Milestones, April/May 2010) details the safety of using two-engine airliners for extended over-water flights. As a reliability engineer and risk analyst, as well as a



## MEDIA GROUP

<b>Director, Smithsonian Media</b>	Thomas Ott
<b>Executive Asst. to the President</b>	James A. Babcock
<b>General Manager</b>	Alan Chu
<b>Group Publisher</b>	Kerry Bianchi
<b>Assoc. Publisher, Marketing &amp; Sales Development</b>	Rosie Walker

<b>ADVERTISING</b>	(212) 916-1300
<b>Ad. Services Manager New York</b>	Marilyn Cruz James F. Else, Regional Sales Dir., Meryle Lowenthal, Elise I. Boeger
<b>Midwest</b>	Bill Milligan
<b>Detroit</b>	Colleen Maiorana
<b>Southwest</b>	Steve Moynihan
<b>Southeast</b>	Kelly Hediger
<b>West Coast</b>	Kate Knox, Charles Carroll
<b>Caribbean/Cent. Amer.</b>	Al Nadal
<b>Mexico</b>	Elsie Mendez Enriquez
<b>Canada</b>	Richard Brown, David Seaberg, Greg M. Smith
<b>Japan</b>	Yoshinori Ikeda, Shigenori Nagatomo
<b>Thailand</b>	Yvan Van Outrive, Ja Pipatra
<b>Korea</b>	S.S. Song
<b>Direct Response</b>	MI Media Services, LLC
<b>Interactive Ad Operations Coordinator</b>	Joel Newman

## MARKETING/RESEARCH

<b>Associate Art Director</b>	Natalie Thompson
<b>Associate Marketing Dir.</b>	Laurie A. Corson
<b>Marketing Manager</b>	Caitlin McCarthy
<b>Promotions Coordinator</b>	Elizbaeth Stoll
<b>Research Manager</b>	Marilyn Resciniti

## CONSUMER MARKETING

<b>Consumer Marketing Dir.</b>	Lisa Dunham
<b>Fulfillment Director</b>	Andrea Sole
<b>Renewals &amp; Gift Dir.</b>	Susan Warner
<b>Purchasing &amp; Operations Manager</b>	Grace Riker
<b>New Business Director</b>	Lori Paldino
<b>Gift Manager</b>	Jonathan Balangon
<b>Associate New Business Manager</b>	Laura E. Vichick
<b>Renewals Marketing Coordinator</b>	Stephanie Petta

## ONLINE PUBLISHING GROUP

<b>Director, Internet Business Operations and Strategy</b>	Michelle McMahon
<b>Manager, Online Marketing and Analysis</b>	Jennifer L. Bock
<b>Sr. Web Designer</b>	Bilikya Schiller
<b>Web Developers</b>	Damie B. Malone, Tony Rosenberger
<b>Sr. Web Producer</b>	Kelly Durkin
<b>Producer</b>	Cheryl Carlin

## MANUFACTURING

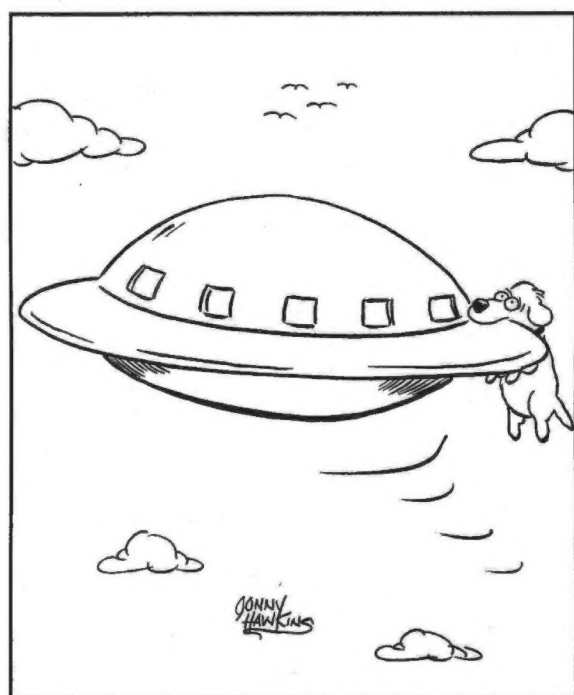
<b>Director</b>	Sarah D. Kingsley
<b>Prepress Director</b>	Katherine Balch
<b>Prepress Manager</b>	F. Matthew Hale II
<b>Prepress Manager</b>	Marie Koller
<b>Color and Quality Mgr.</b>	Stanley Boone
<b>Adv. Systems Manager</b>	Penie Atherton-Hunt

## BUSINESS OFFICE

<b>Business Manager</b>	Ed Dequina
<b>Accountant</b>	Joanne Hubbard

## SMITHSONIAN ENTERPRISES

<b>President</b>	Thomas Ott
------------------	------------





# Support the National Air and Space Museum!

*Help complete the Steven F. Udvar-Hazy Center's New Wing.*



The Museum's success depends on its artifacts that tell the story of aviation and aerospace. That's why Phase Two of the Museum's companion facility, the Steven F. Udvar-Hazy Center, is so important. It will include the Mary Baker Engen Restoration Hangar, Archives, and a Collection Storage Facility. These important facilities will help ensure that our historic air and space exploration artifacts will be cared for and preserved for generations to come.

We must raise this money from private individuals—friends and members like you who embrace our mission to restore, preserve, and display our air and space legacy for future generations. We are close to reaching our goal!

Help complete the Steven F. Udvar-Hazy Center so we can fill it with icons of aviation and space exploration that not only preserve our legacy of flight but also educate and inspire young people to pursue studies and careers in science and space technology.

Those who make a gift of \$100 or more in support of this effort by September 30, 2010 will be recognized in a special advertisement in a future issue of *Air & Space* magazine.

**To make a donation, call 202.633.2603 or visit [www.nasm.si.edu/phasetwo](http://www.nasm.si.edu/phasetwo).**



Smithsonian  
*National Air and Space Museum*

Independence Avenue at Sixth Street SW, MRC 321 PO Box 37012, Washington DC 20013-7012





<b>Secretary</b>	G. Wayne Clough
<b>Director, National Air and Space Museum</b>	General John R. Dailey, USMC (ret.)
<b>SMITHSONIAN BOARD OF REGENTS</b>	
<b>Chancellor</b>	John Roberts, Chief Justice of the United States
<b>Chair</b>	Patricia Q. Stonesifer
<b>Vice Chair</b>	Alan G. Spoon
<b>Members</b>	
Joseph R. Biden Jr. Vice President of the United States	
<i>Appointed by the President of the Senate</i>	
Hon. Thad Cochran Hon. Christopher J. Dodd Hon. Patrick J. Leahy	
<i>Appointed by the Speaker of the House</i>	
Hon. Xavier Becerra Hon. Sam Johnson Hon. Doris Matsui	
<i>Appointed by Joint Resolution of Congress</i>	
Dr. France Córdova Dr. Phillip Frost Dr. Shirley Ann Jackson Mr. Robert P. Kogod Mr. John W. McCarter Jr. Mr. David M. Rubinstein Mr. Roger W. Sant	
<b>SMITHSONIAN NATIONAL BOARD</b>	
<b>Chair</b>	Mr. Paul Neely
<b>Vice Chairs</b>	Mrs. Peggy Paulson Burnet Ms. Judy S. Huret Mr. Gary B. Moore
<b>National Board</b>	
Mr. Rodney C. Adkins Mr. Gordon M. Ambach Ms. Valerie Anders Mrs. Judy Hart Angelo Hon. Barbara McConnell Barrett Mr. William H. Bohnett Ms. Jane Lipton Cafritz Mr. Thomas H. Castro Mr. Wilmer S. Cody Ms. Abby Joseph Cohen Mr. James F. Dicke II Mr. John G.B. Ellison Jr. Ms. Sakurako D. Fisher Mr. Michael R. Francis Mr. John French III Mrs. Shelby M. Gans Mr. E.K. Gaylord II	Ms. Myra M. Hart Mr. Richard W. Herbst Mr. Robert F. Higgins Mr. Steven G. Hoch Mrs. Anne B. Keiser (ex-officio) Mr. Jonathan M. Kemper Mrs. Betsy Lawer Mr. Robert E. Long Jr. Mr. Robert D. MacDonald Mrs. Dorothy S. McAuliffe Mr. Chris E. McNeil Jr. Mr. Russell E. Palmer Jr. Mr. William M. Ragland Jr. Mrs. Kristin Richardson Hon. Ronald A. Rosenfeld Mrs. Marna Schnabel Mrs. Phyllis M. Taylor Mr. Douglas C. Walker
<b>Honorary Members</b>	
Mr. Robert McC. Adams Mr. William S. Anderson Hon. Max N. Berry Mr. L. Hardwick Caldwell III Mr. Frank A. Daniels Jr. Mr. Charles D. Dickey Jr. Mrs. Patricia Frost Mr. I. Michael Heyman	Mr. James M. Kemper Jr. Mrs. Jean B. Mahoney Justice Sandra D. O'Connor (ret.) Mr. Francis C. Rooney Jr. Mr. Wilbur L. Ross Jr. Mr. Lloyd G. Schermer Hon. Frank A. Weil Mrs. Gay F. Wray

Letters

commercial pilot and flight instructor, I was disappointed in the “It can’t happen” tone that the article took on the possibility of multiple engine failure.

Yes, modern turbine engines are very reliable, and two-engine over-water flight is quite safe. But three engines shutting down is not impossible. On May 5, 1983, an Eastern Air Lines L-1011 flying to the Bahamas lost all three engines during an emergency return to Miami International. The aircraft was saved at 3,800 feet over the water because the crew was able to restart one engine and fly the aircraft the short distance to the airport.

How could all three engines fail together? A mechanic forgot to replace O-rings in all three engine chip detectors during an oil change.

Mark P. Rubin  
Rockville, Maryland

Bob Hoover, Comedian

I had the good fortune to twice cross paths with Bob Hoover (“Simply the Best,” Apr./May 2010) in the early 1950s, initially at Nellis Air Force Base in Las Vegas, where this instructor/mentor/big brother/great guy helped us make a drastic cut in the accident rate in the F-86E. A few months later we were flown to a new base in Korea, K55, home to the 18th Fighter-Bomber Wing. The icing on the cake: We would be flying the brand-new F-86F, and Hoover would be sharing his wisdom with the 18th.

Hoover’s arrival raised everyone’s morale at K55. The night before he left, ace Jim Hagerstrom invited four flight

leaders to join him in his hooch to say goodbye. Of the four, two had been shot down in World War II. They both said they had been downed by heavy flak over Berlin. Hoover laughed, saying he had been shot down by flak too, off the coast of France. He paused, then added: “But my flak had the shape of a Focke-Wulf 190.” We all had a good laugh over that.

Donald A. McNamara  
Ponte Vedra Beach, Florida

The Autogiro and Me

I may have been one of the first to see a Pitcairn Autogiro flying (“2010 Airshow Gawker’s Guide,” Apr./May 2010). As a youngster, I was riding around our home on my bike and I fell off. When I looked up, I saw this funny airplane going over the house. I later found out it was the autogiro. In the 1920s, we lived within five miles of the Pitcairn airfield in Pennsylvania. For a birthday present, my father gave me a flight in one of the autogiros. My sister and brother went also. All three of us fit in the seat, so you know that we were rather young and small. The pilot flew us over our home so my mother could look up and see us wave to her.

J. William Raiser  
via e-mail

Correction

August 2010 “Flying Bombers in World War II”: The last photograph of the story shows the author’s mother surrounded by Air Force Academy cadets, not Air Force officers.

**WRITE TO US** at Letters, *Air & Space/Smithsonian*, MRC 513, P.O. Box 37012, Washington, DC 20013. Please type or print clearly. You must include your full address and daytime phone number.  
e-mail: [editors@si.edu](mailto:editors@si.edu). All e-mails must include your full name, mailing address, and daytime phone number.  
*Air & Space* is not responsible for the return of unsolicited materials. Never send unsolicited original photographs to the Letters department; send only copies.  
All letters selected for publication are edited. We reserve the right to publish letters in the magazine, on our Web site ([airspacemag.com](http://airspacemag.com)), or both. We regret that we cannot respond to every letter.





## Some people will have to face the fact they didn't get a Gold Panda. Don't let it be you.

### Get These 2010 Gold Pandas Now Before It Is You

China is making fewer than half a million of their popular twentieth-ounce Gold Pandas this year. They could sell fast.

**GOLD**  
As Low As  
**\$99**

There are 1.3 billion Chinese, and they buy more gold than anybody else in the world. Plus, the attractive Panda design changes every year, so collectors want them.

Gold buyers worldwide want them too because twentieth-ounce Gold Pandas are 99.9% pure gold. And, gold demand is rising and supplies are falling. So, finding affordable gold coins can be a real challenge.

### Save Money, Buy Direct

We're a distributor for Gold Pandas. Our China Buyer acted *fast* to get some for you. While our supplies last, you can get 2010 Twentieth-ounce Gold Pandas for as little as \$99 each (plus s&h).

Now that's affordable gold!

But you must act fast. You may not be able to get them this low ever again.

### Order Now. Risk-Free!

Best of all, you own your 2010 Gold Pandas risk-free with our 30-day money-back guarantee.

In times of economic uncertainty, nothing gives peace of mind like owning gold. Call toll-free today to get your 2010 Gold Pandas.

### Buy more and you save *more!*

- One Gold Panda for only \$129 + s/h
- Three for only \$119 each + s/h **You Save \$30**
- Five for only \$99 each + s/h **You Save \$150**

Toll-Free 24 hours a day  
**1-888-324-9121**

**Offer Code TGP134-03**  
Please mention this code when you call.



14101 Southcross Drive W., Dept. TGP134-03  
Burnsville, Minnesota 55337

[www.GovMint.com](http://www.GovMint.com)

Prices and availability subject to change without notice. Actual size of coin is 13.92 mm. Note: GovMint.com is a private distributor of world-wide government coin issues and is not affiliated with the United States government. Facts and figures were deemed accurate as of May 2010.  
©GovMint.com, 2010





## The Mysterious Second Seat

**AMERICAN SAILORS** sweltering in the Pacific during World War II dreaded Japanese aerial suicide squads, or Kamikaze, whose attacks could be

accelerate toward its final target—usually an Allied warship. The Ohka 22 was able to gain a bit of extra range after separation by using an

Preservation, Restoration and Storage Facility in Suitland, Maryland. “I didn’t pay too much attention to it,” admits Tom Momiyama, who has volunteered at the Museum since 1995. “To me—I’m a technical guy—it’s just a simple glider. Anyone can just wear it and fly it. So I didn’t pay that much attention. I was just looking at it like any other Ohka. Then I said, ‘Wait a minute. Why does it have two seats?’ ”

The answer he got from curators was “It’s a trainer.” But a single-seat trainer already existed; why would the Japanese navy need another version?

Momiyama, an aeronautical engineer who spent 38 years with Naval Air Systems Command Headquarters, started to do some sleuthing. He, Garber restoration specialist Bob McLean, and Malcolm Collum, the Museum’s chief conservator, have worked for the past two years to solve the mystery.

After researching archival materials

in the Museum’s collections and interviewing Japanese historians and veterans of World War II, Momiyama decided that the two-seat version—the MXY7-K2 Ohka—was built for ground-based catapult training. “When you’re being catapulted,” explains Momiyama, “you go from zero to 100 knots or so. That’s different from taking off from a runway, even in a

high-performance airplane. So the Japanese navy decided, Well, for that, we’d better give the pilots one check ride; *that’s* why they built the two-seater.”

Other accommodations were made for training. There’s evidence that a longer, low-speed wing was put on

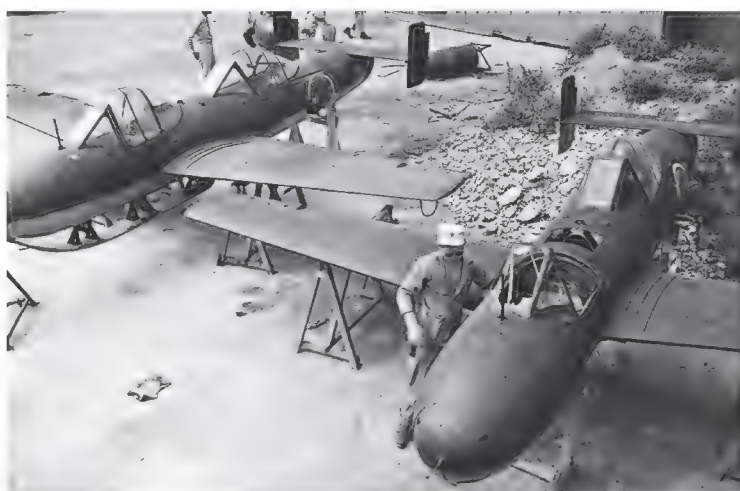


**Museum volunteer Tom Momiyama (above) with the last remaining Ohka K2 at the Museum's restoration facility; the original two prototypes in Japan, ca. 1945 (right).**

devastating: By the end of the war, these units accounted for seven percent of all U.S. Navy crew casualties in the Pacific theater.

While these specialized attack squadrons flew all kinds of Japanese military aircraft, in late 1944 the Imperial Japanese Navy decided to develop a type of human-guided missile to be used against American warships. And so the Ohka was created.

Pilots received little or no training before flying the Ohka. The single-seat Ohka 11 was carried underneath a mothership, and used a short-duration rocket engine assist for evasion or to



early form of a jet engine.

The only remaining Ohka 22 is on display at the Steven F. Udvar-Hazy Center in northern Virginia. But the Museum had a second Ohka, this one corroded and battered, which used to hang from the rafters of Building 2 at the Museum’s Paul E. Garber





# Pioneering audiologist invents "reading glasses" for your ears.

*Neutronic Ear is the easy, virtually invisible and affordable way to turn up the sound on the world around you.*

**You don't have to pay through the nose to get  
Personal Sound Amplification Technology.**

It's amazing how technology has changed the way we live. Since the end of the Second World War, more products have been invented than in all of recorded history. After WWII came the invention of the microwave oven, the pocket calculator, and the first wearable hearing aid. While the first two have gotten smaller and more affordable, hearing aids haven't changed much. Now there's an alternative... Neutronic Ear.

First of all, Neutronic Ear is not a hearing aid; it is a PSAP, or Personal Sound Amplification Product. Until PSAPs, everyone was required to see the doctor, have hearing tests, have fitting appointments (numerous visits) and then pay for the instruments without any insurance coverage. These devices can cost up to \$5000 each! The high cost and inconvenience drove an innovative scientist to develop the Neutronic Ear PSAP.

***Just think of the places  
you'll enjoy Neutronic Ear***

**Parties • Restaurants  
Church • Lectures  
Book Groups • Movies  
Bird-watching and  
almost any daily activity**

Neutronic Ear has been designed with the finest micro-digital electronic components available to offer superb performance and years of use. Many years of engineering and development have created a product that's ready to use right out of the box. The patented case design and unique clear tube make it practical and easy to use. The entire unit weighs only 1/10th of an ounce, and it hides comfortably behind either ear. The tube is designed to deliver clear crisp sound while leaving the ear canal open. The electronic components are safe from moisture and wax buildup, and you won't feel like you have a circus peanut jammed in your ear. Thanks to a state-of-the-art manufacturing process and superior design, we can make Neutronic Ear affordable and pass the savings on to you.

It works... but don't take our word for it. Why pay



***Hard to see • Simple to use  
Easy to afford***

thousands to make everything sound louder when what you really need is a Personal Sound Amplification Product? We're so sure you'll be absolutely thrilled with the quality and effectiveness of this product that we are offering it to the public at a low introductory price with our exclusive trial offer. If, for any reason, you are not completely amazed by how this product improves your life, simply return it for a refund of the product purchase price within 30 days. Call now.

Visit us on the web at  
[www.neutronicear.com](http://www.neutronicear.com)

**NeutronicEar™**  
*The Sound Decision™*

**Call now for the lowest price ever.**  
Please mention promotional code 40547.

**1-888-762-0102**

Neutronic Ear is not a hearing aid.  
If you believe you need a hearing aid, please consult a physician

## The Evolution of Hearing Products

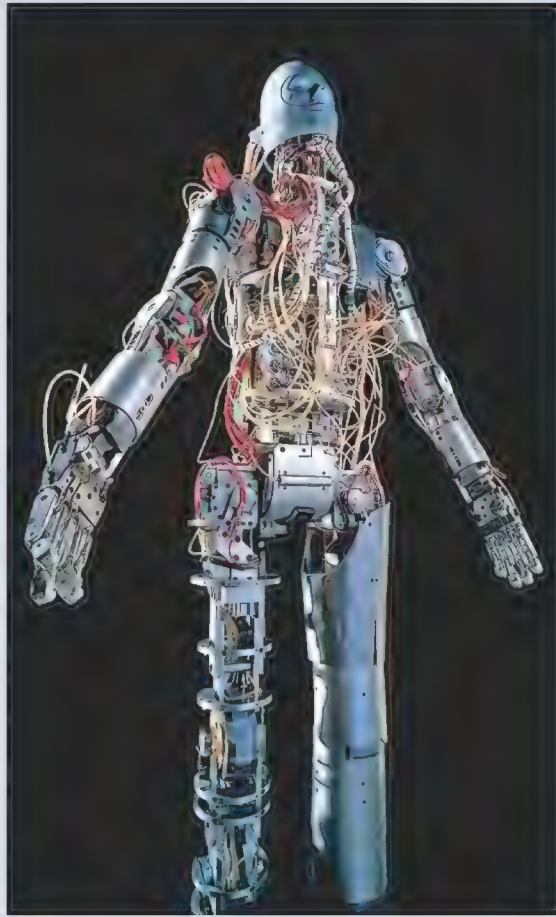
Invention	Date	Easy to Use?	Invisible?	Affordable?
The Ear Horn	17th Century	No	Hardly	Maybe
Wearable Hearing Aid	1935	weighed 2.5 pounds	No	No
Digital Hearing Aid	1984	No	No	Not for most people
Neutronic Ear	2010	Yes	Yes	Yes



## ARTIFACTS

### He's No Dummy

**CONCEIVED AT THE** Illinois Institute of Technology around 1962 to support spacesuit development, this android stood in for human astronauts during design testing. The android's sensors told scientists how much force an astronaut would need to exert to move around in space. "As a dramatic demonstration of its capabilities," writes National Air and Space Museum curator Paul Ceruzzi, "its designers got it to dance 'the twist,' and to mimic the pelvic gyrations of Elvis Presley." The android was donated to the Museum in 1986, and is currently on display at the Steven F. Udvar-Hazy Center in northern Virginia.



have been applied by the U.S. Navy at some point," says McLean. "We are interested in the chronology of the paint layers in order to correctly depict the -K2 as it might have flown."

The fuselage is also damaged—and in a curious pattern. "When you first look at it, you wonder 'Is this shrapnel damage?'" says Collum. "But then you realize that most of the damage is on one side, and none of the holes go completely through. So it's probably from servicemen on the base walking by and just taking a swipe at the *Hinomaru* [the Japanese flag's stylized sun emblem]."

The men are now looking for physical evidence or historical references that would indicate that this specific trainer actually flew. "The detective aspects of this are really thrilling," says McLean, "but unfortunately, it doesn't happen in real time. It happens in some other kind of altered time, and these tidbits kind of come at you from different epochs, and you just have to sit around and wait for them to come your way."

REBECCA MAKSEL

the -K2 for instruction purposes, says McLean, "so they could launch the Ohka and teach these fellows how to get off the catapult rail without killing themselves. I mean, we all knew it was a terminal mission eventually, but it would be a real tragedy losing everybody at the launch rather than at the ultimate objective."

Only two -K2s were built. Designers modified the Ohka 11 trainer and removed one of the water-ballast tanks (used to simulate the bomb load) to accommodate a second cockpit for the instructor. To complement the solid-fuel rockets mounted on the catapult, a booster rocket was added to the tail to increase acceleration.

After the Japanese surrendered in 1945, a U.S. escort carrier transported the -K2—along with about 100 other captured Japanese aircraft—to Alameda Naval Air Station in California. And that's where things got more mystifying.

"The Japanese painted their training and experimental aircraft an orange-yellow," explains Momiyama. But the Ohka is painted a dark green. "One of

the things that we're still trying to decipher is when the -K2 was repainted," says Collum.

"The outside layer of paint seems to

## [ Visitor Information ]



**Star Party** Join Museum astronomer Sean O'Brien on Saturday, September 11, from 7:30 to 10:30 p.m., in observing celestial objects in skies unpoluted by city lights. Sky Meadows State Park, Virginia. Parking fee: \$4 per car. Park phone: (540) 592-3556.



**What's Up** Receive regular updates on Museum events, read about artifacts, get detailed (and behind-the-scenes) exhibition information, and receive calendar listings, all by subscribing to the National Air and Space Museum's free monthly newsletter, *What's Up*. Sign up at [nasm.si.edu](http://nasm.si.edu).



**National Air and Space Society** Members of the National Air and Space Society are charitable donors who support the mission and programs of the National Air and Space Museum. Society membership offers advance access, invitations to special events in the Museum, and other benefits. Like *Air & Space* associate members, National Air and Space Society members receive *Air & Space* magazine and discounts. Unlike associate members, Society members make contributions that help fund the Museum's restoration, preservation, and education efforts. Both memberships support the Smithsonian Institution. For more information, visit [nasm.si.edu/membership](http://nasm.si.edu/membership).



"...classic! The [Stauer] tanzanite  
are a beautiful shade of violet  
blue...full of color!"

— PRAISE FOR STAUER TANZANITE  
FROM C. OF MISSOURI



## Endangered Gem Disappearing

Tanzanite is found in only one remote spot on Earth, and it's 1,000 times rarer than diamonds. Experts say the mines will soon run dry forever, but today you can own more than 1 carat for **Better Than FREE!**

Time is running out. Geological experts predict the world's supply of tantalizing tanzanite will disappear in a matter of just a few years. Maybe sooner. High-end retailers are raising prices on this rare stone. And gem dealers are in a mad scramble to secure their claim before it's too late. Let them scramble.

Our buyer recently secured a huge cache of beautiful rare tanzanite, the precious stone loved for its vivid violet-blue color. Today you can own over 1 carat of this rare stone (1,000 times rarer than diamonds) in our spectacular **Tanzanite Cluster Ring** with a suggested retail of \$795

for only **\$95**. Want to learn how to get this magnificent ring for **Better Than Free**...read on.

Order the exclusive **Tanzanite Cluster Ring** (1 1/5 ctw) for \$95 and we'll give you a **\$100 Stauer Gift Coupon**. That's right. You pay \$95 and you get the Tanzanite Ring AND \$100 toward your next Stauer purchase. This is our impossible **Better Than FREE** offer.

**It started with a lightning bolt.** One strike set the African plains on fire and uncovered a secret that was buried for more than 585 million years. Tanzanite naturally occurs in only one place on Earth: Tanzania's remote Merelani Hills, in the shadow of Mount Kilimanjaro.

**World's most endangered gem.** Top-quality tanzanites can often fetch higher prices than diamonds. But, once the last purple gem is pulled from that remote spot beneath Kilimanjaro, that's it. No more tanzanite.

**Reserve your piece of gem history.** If you go online right now, you'll find one of the largest retailers selling tanzanite rings for well over \$2,000 each. Ridiculous. Instead, you can secure your own piece of limited-edition tanzanite history at the right price.

**Better Than FREE and Guaranteed.** Our **Better Than FREE** offer is so consumer friendly that we have earned an **A+ Rating** with the Better Business Bureau. But, why a \$100 Gift Coupon with your \$95 purchase? It's simple. We want you to come back to Stauer for all of your jewelry and watch purchases. If you are not 100% delighted with your ring, send it back within 30 days for a full refund of the purchase price. Just remember that the odds of finding this stone at this price ever again is like waiting for lightning to strike the same place twice.

#### JEWELRY SPECS:

- 1 1/5 ctw tanzanite
- Rhodium-layered .925 sterling silver setting
- Ring sizes 5–10

**Tanzanite Cluster Ring** (1 1/5 ctw)—~~\$795~~ **\$95** + S&P **PLUS**

**\*Better Than FREE—Receive a \$100 Stauer Gift Coupon with the purchase of the Tanzanite Cluster Ring.**

Call now to take advantage of this limited offer.

**1-888-870-7339**

Promotional Code CTR133-01

Please mention this code when you call.



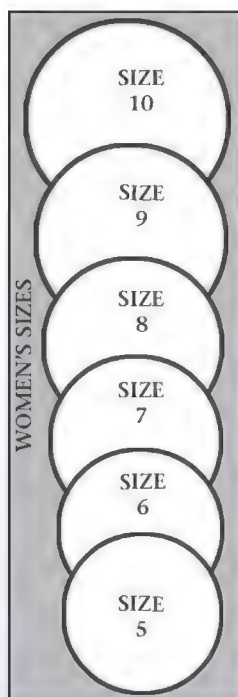
ACCREDITED  
BUSINESS

Stauer has a **Better Business  
Bureau Rating of A+**

**Stauer**

14101 Southcross Drive W., Dept. CTR133-01  
Burnsville, Minnesota 55337

[www.stauer.com](http://www.stauer.com)



**USING THE RING SIZE CHART**  
Place one of her rings on top of one of the circle diagrams. Her ring size is the circle that matches the inside diameter of the ring diagram. If her ring falls between sizes, order the next larger size.



## The Oldest Powered Flying Machine?

**FOR MORE THAN** four decades I have nursed a fascination with what one might call the prehistory of aviation, or, as a friend would have it, crypto-aviation history. In a nutshell, I am fascinated by pre-1903 attempts at winged flight.

The fascination began in 1969, when I was conducting research on the history of flight in Ohio as part of curatorial planning for what was to become the Neil Armstrong Air & Space Museum in the astronaut's hometown, Wapakoneta. While scouring the fragile pages of *Cincinnati* newspapers for information on Thomas Kirkby, who launched the state into the air age with a balloon flight from Cincinnati in 1834, I ran across a series of intriguing articles on the work of one Mr. Mason, or Masson, who was preparing to fly his Aerial Steamboat in the Queen City that summer.

The *Liberty Hall & Cincinnati Gazette* introduced Mason to readers in an article appearing on June 24, 1834. "Perhaps it is not generally known," the article began, "but one of our ingenious local citizens has invented, and has now in preparation, the model of an *aerial steamboat*." While the reporter had "but little expectation of the success of the experiment," the inventor was said to be "very sanguine, having already made (to him) a very successful experiment."

The hull of the craft was shaped like a boat and lined with ribs: "to render it very light," the builder covered it in silk. A two-horsepower steam engine, positioned in the center of the boat, turned "four vertical shafts projecting

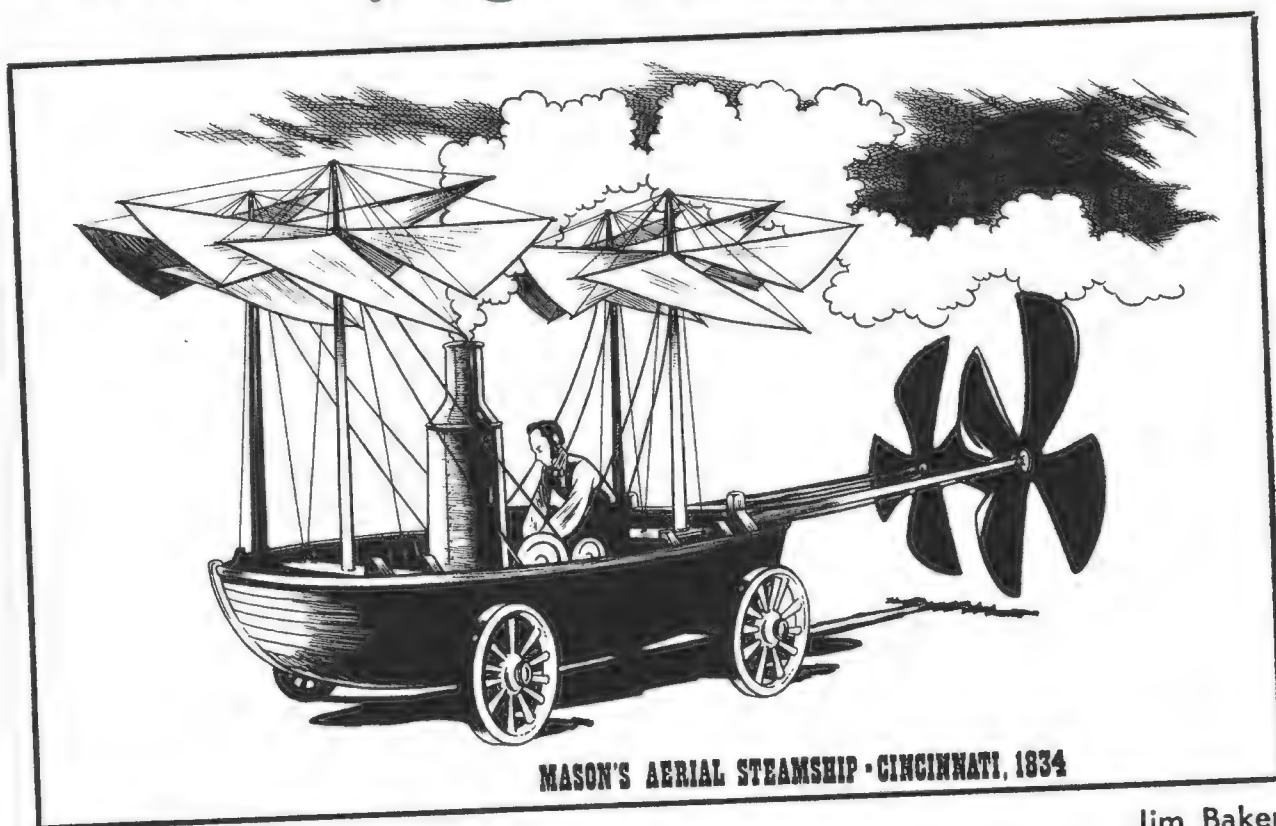
over the bow and stern into each of which are fixed four spiral silken wings which are made to revolve with sufficient velocity to cause the vessel to rise." Also included: a "moveable silken cover designed to assist in counteracting the gravitating force, [while] at the same time tending to assist in its propulsion forward." The craft, which had cost \$300 to build, weighed only 60 pounds. The inventor intended to fly his creation on July 4. Until then, it was on display "on Race Street nearly opposite the old Lathe factory, below Third St."

July 4 came and went without a flight. On August 23, the *Daily Cincinnati Republican and Commercial Register* reported that the Aerial Steamboat would be displayed at the Commercial Exchange early the following week. "Mr. Masson, an ingenious mechanic, has spent some months constructing this vehicle, in which he expects to navigate the air by the force of steam." There is, the paper

From contemporary news articles and earlier hints from Sir George Cayley, a cartoonist created this depiction of what the 1834 mystery craft could look like.

noted, "nothing of the balloon principle connected to this apparatus." Having inspected the craft, the reporter was unwilling to predict success or failure, but assured readers that it was "a beautiful and ingenious piece of mechanism."

On October 22, 1834, the inventor, signing himself A. Masson, announced in the pages of the *Daily Cincinnati Republican* that he had opened a subscription, hoping to raise \$1,500 to cover his expenses. He was quick to assure potential supporters that no money need be paid until he had actually flown his machine. That would seem to remove the inventor from the ranks of mountebanks and confidence men. Four days later, the *Cincinnati Chronicle and Literary Gazette* offered additional technical details. The



Jim Baker



four vertical spindles were driven by leather bands that the engine kept moving.

“Upon each of these spindles are placed four wings, shaped like a paper fan, when open, with the broad end from the spindle; these wings are not horizontal, but one edge is raised higher than the other. When the spindles are made to revolve, the wings, thus inclined, strike the wind with so much of their broadside as to occasion considerable resistance and the consequent tendency is to make each wing, instead of round against this resistance, to move at an angle upward, cutting the air with its edge. It is in a manner screwing up into the air.”

At this point, A. Masson and his Aerial Steamboat vanish from the city’s newspapers. Who was this fellow, and what can we make of his valiant attempt to build and fly a heavier-than-air craft? First, what was his name? The Cincinnati directories for the 1830s fail to list anyone named Masson, the name provided by the inventor in the only article he seems to have written himself. The Cincinnati Directory for 1834, however, the year in which the craft was built and exhibited, does list an Albert Mason, a steamboat mate living on East Front Street. The fact that a steamboat mate would be familiar with the propulsion system described, combined with the nautical references in all of the accounts of the vehicle, suggests that the inventor was a steamboat man. It does not seem too much of a stretch to regard Albert Mason as a prime suspect for our “ingenious mechanic.”

And what would the Aerial Steamboat have looked like? The articles several times refer to the craft as a model, and one weighing only 60 pounds sounds too light to carry an adult into the air. Moreover, in his

article of October 22, 1834, Mason says only that he will cause his “machine to ascend beyond the surface of the earth to an elevation of, say 100 feet.” It seems clear that the machine was meant to demonstrate the basic principle, and that a later and larger craft would carry the inventor to higher altitudes.

Oddly, the best clue regarding its appearance was published nine years later, in 1843, by the great English aeronautical experimenter Sir George Cayley, who proposed an “aerial carriage” with the essential features of Mr. Mason’s craft. Cayley’s design featured four vertical spindles on each side of a boat-shaped hull, extending fore and aft, each supporting a fan-shaped rotary wing of exactly the sort

by Jim Baker, a Columbus cartoonist who produced newspaper comic strips and illustrated comic books on Ohio history. Last year my colleague Greg Bryant, a National Air and Space Museum registrar, produced an Aerial Steamboat model based on Jim Baker’s vision. While both the drawing and the model show the boat hull sheathed in wood, rather than covered in silk, and with a forward propulsion system not described in the newspapers, my guess is that Mr. Mason would recognize the craft depicted.

And now the most important question: Who cares about any of this? Well, I do. If we are to believe the articles published in the Cincinnati papers, and there seems no reason to doubt them, then Albert Mason, or

**At this point, A. Masson and his aerial steamboat vanish from the city’s newspapers. Who was this fellow, and what can we make of his valiant attempt to build and fly a heavier-than-air craft? The fact that a steamboat mate would be familiar with the propulsion system described, combined with the nautical references in the accounts of the vehicle, suggests that the inventor was a steamboat man.**

the Cincinnati inventor described. Perhaps this configuration was something that naturally occurred to two very different men separated by an ocean and nine years’ time. Or could word of Mason’s craft have made its way across the Atlantic to inspire Sir George?

Of course there are no photographs of Mason’s craft. When I first discovered the strange case of the Aerial Steamboat, I was the Chief of Education for the Ohio Historical Society and wrote a short article for the society’s newsletter, *Echoes*, that was illustrated

Masson, was the first person in history to produce a heavier-than-air craft, powered by a prime mover, that was actually intended to fly.

The problem is, I don’t know any more about this fellow than I did when I first ran across his name 40 years ago. The point of this story is not simply to introduce readers of *Air & Space* to an interesting if somewhat arcane bit of aeronautical trivia, but also to spread the word in the hope that someone can help me discover a bit more about this long-lost aerial dreamer.

 TOM D. CROUCH



## Avi Loeb: The Origins of Galaxies

THEORETICAL ASTROPHYSICIST, HARVARD-SMITHSONIAN CENTER FOR ASTROPHYSICS

**ABRAHAM (AVI) LOEB** is a professor of astronomy at Harvard University. Born in Israel in 1962, he is one of the pioneers in the field of early star and galaxy formation. His latest book, *How Did the First Stars and Galaxies Form?*, was published this year by Princeton University Press.

**What discoveries do you expect in the near future that will help explain the early history of the universe?**

In the next five years, astronomers will try to detect the scars that the first galaxies left on the hydrogen gas surrounding them. When stars form, they produce ultraviolet radiation that can ionize, or break, the hydrogen atoms into their constituent electrons and protons. You end up with bubbles of ionized hydrogen surrounding galaxies and groups of galaxies. We haven't yet seen the process during which the very first galaxies formed and produced these bubbles.

**Once we see this process, will that also explain why present-day galaxies, like the Milky Way, look the way they do?**

It will tell us how the process started. We're basically looking at our origins. The early universe was not hospitable for life. Only after that first generation of stars fused hydrogen in their cores to make heavier elements, like carbon, oxygen, and iron, could rocky planets like the Earth form and life begin. If we want to trace our origins—the scientific version of the story of Genesis—then we need to understand how the first stars formed and how they produced heavy elements. The first galaxies were the building blocks of the Milky Way, and the desire to understand them is a search for our roots.

**In your book you list milestones that occurred within fractions of a second**

**after inflation. Is there already empirical evidence for them?**

For some of these events, there is evidence beyond a reasonable doubt. For others, there is a question mark because we have only indirect evidence.

**How does the scientific community agree on what happened?**

If there is no empirical data, then the community will never agree because there are always multiple options. People are just not convinced by theoretical arguments; they really need to see the evidence. It's sort of like a detective story: Unless you have the clues, the story will not be accepted in court. We have observed directly the cosmic microwave background—radiation that is a relic of the Big Bang—so we know that the universe was denser and hotter in the past. But we haven't yet figured out inflation, the fast expansion of the universe from a space smaller than an atom to a cosmos 100,000,000,000,000,000,000 [100 sextillion] miles in diameter. Some people are still skeptical about inflation.

**Why did you pick this time to publish a book explaining the current beliefs about how stars and galaxies form?**

The year 2010 marks a major transition point in studies of the first stars and

galaxies. Until now, most of the research has been theoretical. The next decade will bring about a new generation of large telescopes with unprecedented sensitivity that promise to supply a flood of data about the infant universe during its first billion years after the Big Bang. Among the new observatories are the James Webb Space Telescope—the successor to the Hubble Space Telescope—and three extremely large telescopes on the ground. The fresh data on the first galaxies and the diffuse gas in between them will test existing theories about the formation and radiative effects of the first galaxies, and might even reveal new physics that has not yet been anticipated. This emerging interface between theory and observation will constitute an ideal opportunity for students considering a research career in astrophysics or cosmology. Since this is an ideal time to introduce new researchers to the field, I decided to write a book that summarizes the fundamental principles and theoretical ideas from the perspective of my own work over the past two decades. —



Avi Loeb, director of the Harvard-Smithsonian Institute for Theory and Computation, authored a new book on cosmology.



Read the entire interview at [airspacemag.com](http://airspacemag.com)



**Extremely  
Limited Availability**

1 carat marquise-cut  
DiamondAura® bail

3/8 ctw round  
DiamondAura® accents

5 carat pear-cut  
DiamondAura® center

Set in .925 sterling silver

**Special Offer\***

**Receive \$200 in Stauer  
Gift Coupons with the  
purchase of this necklace.  
Yes, you read that right.**

## Better Than FREE?

**Stauer gives back! Get our 6-carat French Pear Pendant for \$195 and get \$200 in gift coupons!**

**B**etter than free? Believe it. Stauer is returning some of its success to our many clients with the lavish, limited edition 6-carat *French Pear Drop Pendant* along with a special gift.

Despite tough economic times, Stauer has had a very good year. Now it's time to give back. That's why when you purchase the DiamondAura® *French Pear Drop Pendant* Necklace for \$195, you'll receive two \$100 Stauer gift coupons. That's \$200 you can use on any of our hundreds of pieces of fine jewelry, vintage watches and luxury goods. Basically, we're paying you to shop Stauer.

**Breaking the big-carat barrier.** DiamondAura® has proven to be a magnificent lab creation since we first released it five years ago but, up until now we couldn't make a DiamondAura® pendant larger than 2 3/4 carats. Today we release the ultra-luxury, majestic lab-created DiamondAura pendant with stunning clarity, cut and color rarely seen. Our Pendant features a 5 carat, pear-cut DiamondAura that dangles from an 18" chain of the finest .925 sterling silver. The pear is topped with an impressive 1 carat marquise-cut DiamondAura bail.

**The Four Cs.** Our exclusive DiamondAura jewelry has splendid specifications: color, clarity, cut, and carat weight. We won't

COMPARE FOR YOURSELF AT 6 CARATS		
	Mined Flawless Diamond	DiamondAura® Comparison:
Hardness	Cuts Glass	Cuts Glass
Color	"D" Colorless	"D" Colorless
Clarity	"IF"	Clear
Dispersion/Fire	0.044	0.066
6 ctw necklace	\$200,000+	<b>\$195</b>

bore you with the details, but we've invested close to \$6 million in developing DiamondAura. The complex laboratory process involves rare minerals heated to an incredibly high temperature of nearly 5,000° F inside some very modern and expensive equipment. Using chemistry, we found a better way to match the fire and brilliance of a "D" flawless diamond at a much more reasonable cost.

**Here's the plain truth:** Times are tough, people are strapped and the bottom has dropped out of our economy. It doesn't matter if you're from Wall Street, Main Street or Rodeo Drive, everything has changed. If you have a house, a 401K or a bank account... you've taken a financial hit. But you still need to surprise her with something that will truly take her breath away.

**Sound to good to be true?** Let me explain: at Stauer we don't make money selling one piece of jewelry to you, we stay

in business by serving long term clients. Our data tells us that when you become a Stauer client, you'll be back.

**Even a Recession has a silver lining.** If you are not thrilled with the DiamondAura *French Pear Drop Pendant*, return it within 30 days for a refund of your purchase price. Our DiamondAura will last forever, but our **limited edition** will not. Call today to take advantage of this offer.

**JEWELRY SPECS:**

- 5 carat pear-cut center DiamondAura®
- 1 carat marquise-cut DiamondAura® bail
- Set in precious .925 sterling silver
- 18" princess-length chain of .925 tarnish-free sterling silver

**French Pear Drop Pendant Necklace**  
(6 ctw) **only \$195** +s&p

**Special Offer\*—Receive \$200 in Stauer  
Gift Coupons with the purchase of  
the French Pear Drop Pendant**

**\*\*\*Due to expected demand, this is a  
very limited time offer. Call today!\*\*\***

*Call now to take advantage of this limited offer.*

**1-800-721-0386**

**Promotional Code PDN232-03**  
Please mention this code when you call.

**Stauer**

14101 Southcross Drive W.,  
Dept. PDN232-03  
Burnsville, Minnesota 55337  
**www.stauer.com**



# THE TRUTH IS OUT THERE

*A veteran  
reporter describes  
his search for  
the aircraft of  
Area 51.*

**BY WILLIAM B. SCOTT**

“And you’ll see a very long runway right...there.” Our aircraft commander jabbed a finger at a small, cross-hatched circle on the U.S. Air Force navigation chart. **“But, even if we lose all four engines,” he said, “we will *not* land on it.”**

“Why not, sir?” I asked.

“We’d be there a long time and have to answer a lot of questions,” the commander replied, then moved on to the next day’s mission preview. A four-stripe sergeant leaned toward me. “That’s Groom Lake,” he said under his breath. “That’s where the really secret [stuff] happens.”

As a 22-year-old airman, I thought our outfit’s nuclear-sampling missions were mighty secret stuff. Not until the 1970s, when the Air Force Technical Applications Center’s mission was declassified, could we tell our families that we had

routinely flown a variety of aircraft—from C-54s to B-52s—through radioactive clouds from U.S. and foreign bomb tests, collecting nuclear debris and gaseous samples (see “Into The Mushroom Cloud,” Aug. 2009). We wore plain black baseball caps and olive-drab flightsuits with no unit patches, and carried only the most basic identification. Whatever was going on at Groom Lake evidently was even more classified than our mission. I was impressed—and very curious.

That preflight briefing, at McClellan Air Force Base in California in the sum-





LEFT: COURTESY KPITV; MAP: USGS

**Nevada's mountains (opposite) provide a wall around one of the world's most secret places. If that's not enough, signs (below) warn the curious to keep out.**

knowledge that the place existed.

This black hole of military and intelligence-community secrecy is a product of the cold war, when the United States desperately needed to spy on Soviet bomber and missile developments. In the 1950s, when satellites capable of watching airfields, missile silos, and test sites across the Soviet Union were years away, the Central Intelligence Agency awarded Lockheed's advanced development division, by then known as the Skunk Works, a contract to build what became the high-altitude, long-endurance U-2 spyplane. Designer Clarence "Kelly" Johnson directed Lockheed test pilot Tony LeVier to find an out-of-the-way airfield where the U-2 could be flight-tested. It had to be remote enough to prevent Soviet agents from spotting the black, long-winged airplane, yet reasonably close to Lockheed's southern California engineering and aircraft production plants.

LeVier scoured the southwestern United States in a light aircraft, ultimately settling on a dry lakebed deep within the nation's Nuclear Test Site complex in Nevada, which the Air Force had opened to the Atomic Energy Commission in 1950 to conduct nuclear weapons tests. In the summer of 1955, facilities were quickly built along the south shore of Groom Lake, and a few months later, U-2 test flights began. Johnson thought the infrastructure would be temporary, but over the next 50 years, new buildings and longer runways were built to accommodate development of numerous secret aircraft, including Lockheed's SR-71 Blackbird, its A-12 and YF-12 cousins, the F-117 Nighthawk stealth fighter, and one-of-a-kind technology demonstrators. An impressive fleet of foreign fighters and attack aircraft—primarily Russian—also were collected at Groom Lake, flown, and evaluated by a group of test pilots and engineers known as the Red Hats.

In Johnson's time, Lockheed workers called Groom Lake "the Ranch" or "Wartown Strip." Flight test professionals at Edwards Air Force Base in California,

which maintains a unit at Groom Lake called Detachment 3, referred to it as "the Site." U.S. and foreign pilots participating in large-scale Red Flag exercises flown from Nellis Air Force Base in Nevada know Groom as "the Box," a no-fly zone that often complicates the massive air-combat training scenarios. To most of the public, it's simply "Area 51," a reference to a numbered section on 1950s Atomic Energy Commission maps that divided the Nevada Test Site into grids.

**SINCE 2005**, Groom has undergone a robust burst of construction. The base now comprises numerous large hangars, dozens of worker dormitories, unusually long, paved runways, acres of concrete ramp space, recreation facilities, and even a watering hole called Sam's Place, I learned from base employees. Groom watchers have spotted an enormous new hangar boasting an estimated 65,000 square feet, sheltered by a roof that at its peak soars to about 100 feet. Naturally, the expansion has fueled considerable speculation among enthusiasts who try to track Groom's goings-on, especially the black-program aircraft based there. One of my sources at the Pentagon said the base's current fleet is dominated by unmanned aerial vehicles like the Air Force's RQ-170 Sentinel. Dubbed the "Beast of Kandahar" by U.S. troops in

mer of 1969, was my introduction to one of the most secret aerospace development and testing sites in the world. Over the next 40 years, the Groom Lake mystery surfaced time and again, first in my role as a flight test engineer and later as a reporter for the magazine *Aviation Week & Space Technology*. But, like every other journalist chasing the story, I have yet to set foot on the alkaline dry lakebed with ultra-long runways, despite multiple requests to visit.

The secluded desert base, nestled along the rim of Groom Lake, about 80 miles north-northwest of Las Vegas, has been a test site for intriguing, cutting-edge aircraft since 1955. It has also been a breeding ground for rumors and conspiracy theories. Until the 1990s, the U.S. government wouldn't even ac-



JULIAN CHECKLEY





Marked with fake National Advisory Committee for Aeronautics insignia and numbers, the CIA's high-flying U-2 spyplanes (left) were transported to Groom Lake in pieces from Lockheed's Burbank, California plant and assembled at the base for flight tests in the 1950s. Above: On the remote desert airstrip, a Douglas C-124 Globemaster disgorges a shrouded U-2.

Afghanistan who have seen it, the stealthy Sentinel—a tailless flying wing built by Groom Lake's first tenant, the Skunk Works—is tailored for tactical intelligence, surveillance, and reconnaissance missions to support combat troops. The Air Force confirmed the Sentinel's existence in December 2009, but details about the gray, unarmed UAV—which was first spotted at Kandahar Airfield in late 2007—remain classified.

Although the federal government grudge-

programs were then costing U.S. taxpayers between \$30 and \$36 billion a year—almost \$100 million per day.

Far more productive were my interviews with dozens of people who reported seeing and hearing strange aircraft, mostly at night, primarily in the southwestern United States. Based on those and some of my own observations, I wrote about aircraft that produced unusual contrails and a deep, crackling roar described as “the sky ripping.”

## In 1992, a series of intercepted radio transmissions presented a new possibility for the mystery airplane: maybe the black world was flying in space.

ingly acknowledges that the base does exist, Groom's silence is still intact today, and its reputation for keeping secrets remains unblemished. Other intelligence units, such as the National Security Agency and the CIA, have suffered embarrassing security breaches over the years, but if any of Groom's secrets have escaped, they didn't make the news.

Such uncompromising secrecy can breed abuses. In the early 1990s, while I was researching Groom as a journalist, a former engineer from the base encouraged me to look into the amount of money being spent on the programs there. I devoted considerable time and effort to investigating those expenditures, but the black money trail proved almost impossible to follow. I did determine that the

Then, in the early 1990s, a CNN reporter faxed my magazine a sketch of an unusually large aircraft he had spotted flying over the Georgia countryside on a Sunday afternoon. Painted white, it closely resembled the retired North American XB-70 supersonic bomber. But there was something different: vertical tails positioned at the aircraft's wingtips. (The vertical fins of the XB-70 were located in-board, closer to the fuselage centerline.) It couldn't have been the XB-70 itself: The last one in existence was parked at the National Museum of the U.S. Air Force at Wright-Patterson Air Force Base in Dayton, Ohio.

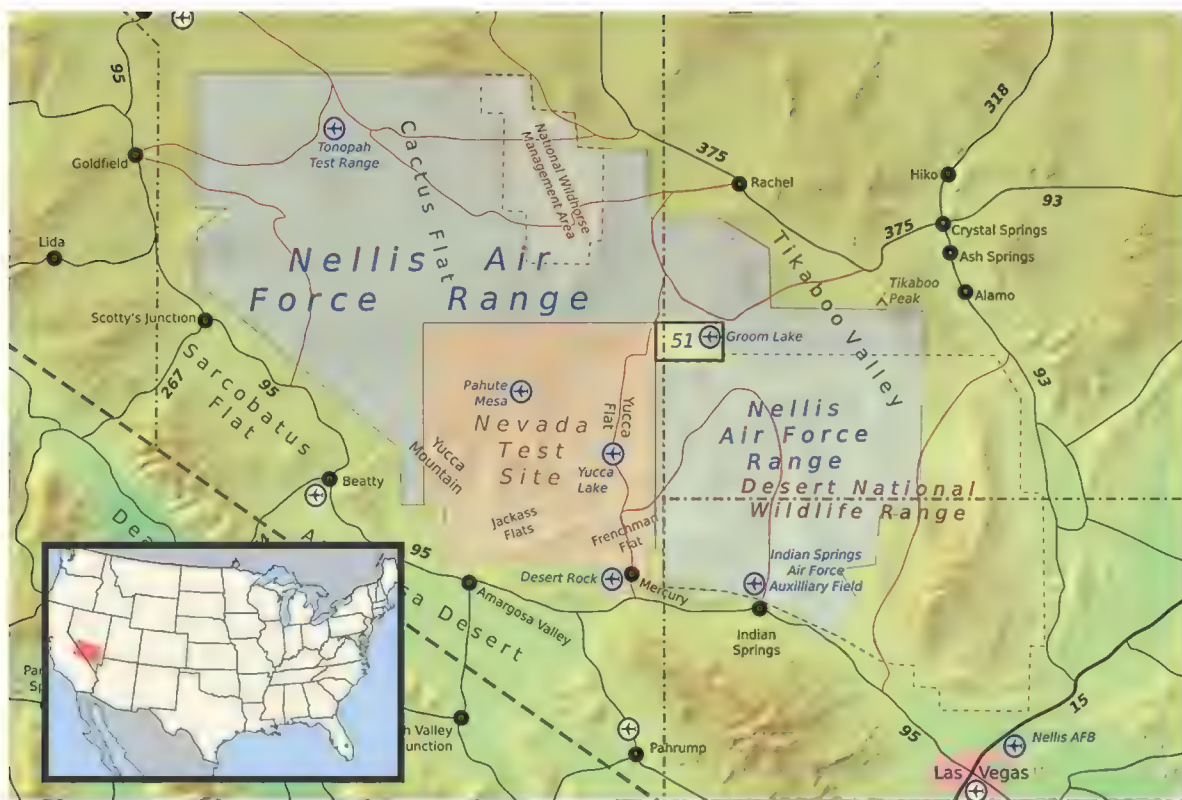
Over the next few years, I collected half a dozen similar sketches, and all of them closely resembled the old bomber. Most

eyewitness reports and sketches came from credible aerospace and military workers who were familiar with military aircraft. But calls also came from non-aerospace types. One particularly compelling report came from a witness who had seen the XB-70-like aircraft over her Pennsylvania home at very low altitude, less than 200 feet—so low, in fact, that she could tell the right-seat pilot was wearing a white helmet. The woman was an avid bird-watcher, and was pursuing a doctorate in immunology, so I considered her a legitimate witness: a seasoned scientist with good observational skills.

Typically, these sightings were accompanied by a distinctive, deep-throated, sometimes pulsing engine roar and unusual contrails described as “doughnuts on a rope”—spaced, puffy rings surrounding a thick rope of condensed exhaust—or segmented puffs, like a string of sausage links. I was able to obtain good photos of the contrails, and we published them, along with the eyewitness reports. However, proof that all these incidents were linked to a single aircraft or aircraft type continued to elude us.

At one point, an obscure reference to “Aurora” in a Department of Defense budget document fueled speculation in the media that a high-speed replacement for the SR-71 (which would be retired in 1998) was being developed or had already gone operational. We ultimately decided that Aurora was simply a cover name, a budget niche to hide money that the Pentagon was funneling to the Air Force's classi-





LEFT: USGS; RIGHT: COURTESY THE MARK SECURITY



**Area 51 (left, yellow box) refers to old Atomic Energy Commission maps that divided the Nevada Test Site into a grid. Highway 375, which runs through Rachel, Nevada (above), is the closest road to the base. Below: A GeoEye satellite image reveals long runways and large hangars.**

fied B-2 Spirit bomber program.

In 1992, a series of intercepted radio transmissions presented an entirely new possibility for the mystery airplane. Around 6 a.m. Pacific time on April 5 and 22, Steve Douglass, an investigative journalist who monitors military aircraft radio chatter and maintains a black-projects blog ([www.DeepBlueHorizon.blogspot.com](http://www.DeepBlueHorizon.blogspot.com)), picked up transmissions between Edwards' radar control facility and a high-

altitude aircraft that was using the call sign "Gaspipie." Controllers were directing the aircraft to a landing, using advisories that would be familiar to space shuttle astronauts returning from orbit. Edwards told Gaspipie: "You're at sixty-seven thousand [feet], eighty-one miles out." Moments later, Edwards radioed, "Seventy miles out, thirty-six thousand. Above glide slope." During years of flight testing in the Edwards area, I had heard controllers

issuing similar clipped directives. The cadence and tone of the one talking to Gaspipie were the same. I concluded that Douglass' recording was authentic. The mystery aircraft was descending rapidly, dropping from an altitude of more than 12 miles to almost seven in a few seconds, and evidently it lined up to land. Where, we didn't know. Maybe Groom Lake.

No fighter aircraft operated at such high altitudes, and my *AvWeek* colleagues and I quickly confirmed through NASA and the Air Force that no U-2s or SR-71s were airborne at those times. In followup calls, I was told the base's radar approach control facility showed no record of controllers "working" an aircraft with the call sign Gaspipie on those dates.

I started wondering whether the spooks at Groom were flying a new spaceplane: a manned vehicle that could reach orbit, then return to land on a remote runway. My colleagues and I chased this mystery for more than a dozen years. In March 2006, we published a story about what was called the Blackstar two-stage-to-orbit system. We lacked proof, but had first-hand accounts from military pilots, technicians, and engineers of a small spaceplane, code-named the XOY—short for Experimental Orbital Vehicle—that was carried under the belly of an XB-70-like aircraft known as the SR-3. Earlier that year, a Groom insider had told me Blackstar had been shelved, because "it didn't work out as well as we'd hoped." Whether the problems were technical or financial, we may never know.



GEOEYE



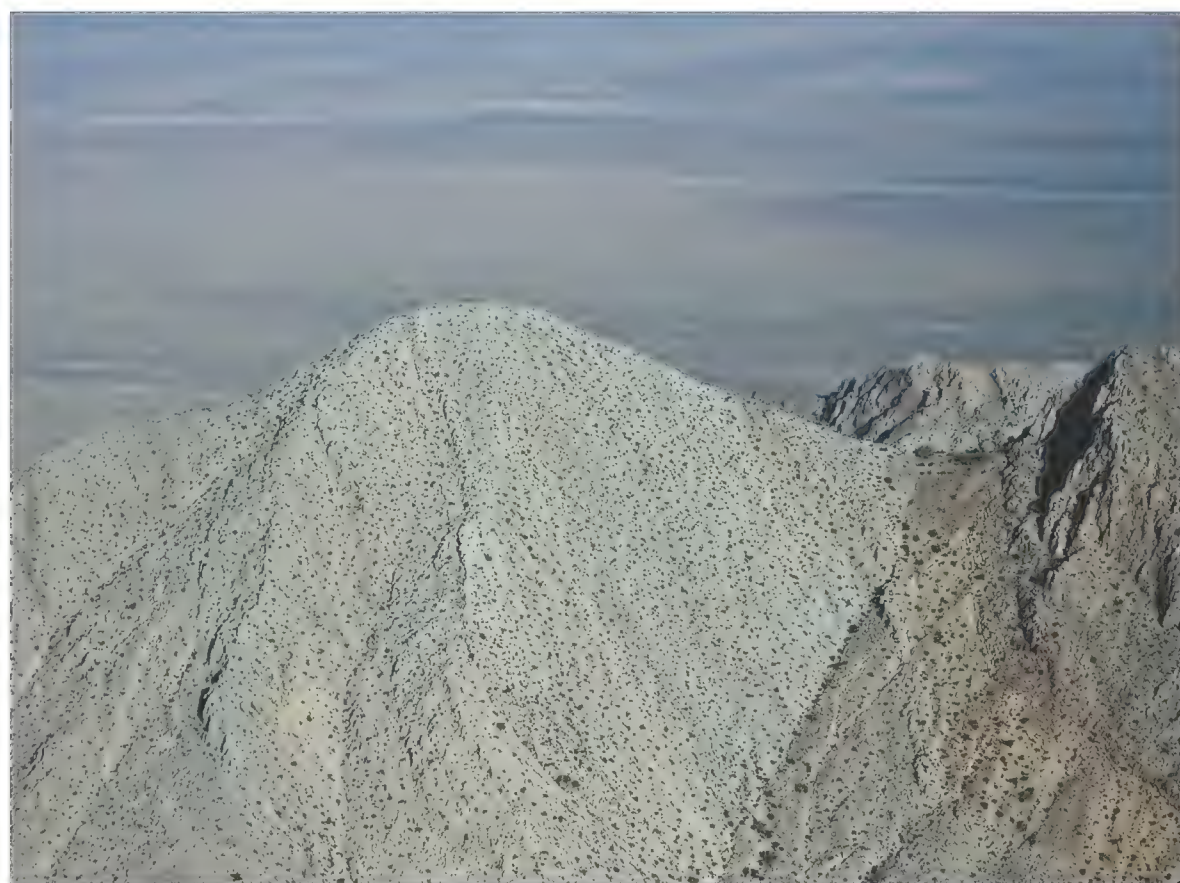
**IN THE EARLY 1990s**, when I was working from a home office in the high desert of southern California, about 45 miles from Edwards, I seemed to be at the center of spook-aircraft reports. The more stories we ran about black aircraft, the more reports we seemed to receive. Soon I was getting phone calls in the middle of the night from avid sky-watchers, urging me to “run outside and look to the north! The ‘pulser’ just flew over Mojave!” I never saw this particular aircraft, but I did hear its loud, pulsing signature a few times. In years in the flight test business, I had heard more than a few jet engines. This was something new.

Sightings were funneled my way, but other *AvWeek* reporters were also vetting the information. Trying to piece together dozens of observations, sketches, and a few photos, then deciphering what they meant, was like working on a 400-piece jigsaw puzzle with only 250 pieces. No matter how we shuffled the pieces, we could not be sure we had identified the full picture. Many of my sources refused to discuss black matters over the phone; their jobs and security clearances were at stake. And a law enforcement friend had confirmed that my home office phone line had a legal tap on it, from a court order in the 212 area code (New York City).

**I was getting phone calls in the middle of the night from avid sky-watchers, urging me to “run outside and look to the north! The ‘pulser’ just flew over Mojave!” I never saw this particular aircraft, but I did hear its loud, pulsing acoustic signature a few times. In years of flight testing, I had heard more than a few jet engines. This was something new.**

I was never able to find out who had requested the tap or why. Consequently, my sources and I resorted to using codes. I’d call and ask a question such as “Are you helping with the silent auction at the kids’ school next week?” Translation: “I’ll meet you in the Gemco parking lot in 15 minutes.”

Several times my colleagues and I rented night-vision gear and set up makeshift observation sites near Edwards. Long nights of shivering in the desert, watch-



**The best legal view “black”-aircraft watchers get is from here: atop 7,900-foot-high Tikaboo Peak. Groom Lake lies 30 miles away, beyond the ridgeline’s light-gray peak.**

ing and listening, ultimately yielded one intriguing videotape: Our team saw and recorded what we called the “dripper,” a long, thin aircraft, cloaked in gold light, that appeared to shed luminescent clumps or pearl-like globs. I wasn’t with the team that night, but when I viewed the tape the next morning, I was just as puzzled and

erably at *visual* stealth.

We had data and some intriguing theories but no confirmation. However, much of what we did have seemed to point to one place: Groom Lake. It was time to join the cadre of watchers who prowled the borders of this enigmatic Mecca of advanced aircraft. In the mid-1990s, the federal government extended the borders of the restricted areas around Groom, removing almost 4,000 acres of land from public access. The base’s facilities could be seen clearly from only a few mountains and ridge lines, and the move prevented anybody climbing them. The one remaining viewing site was Tikaboo Peak, about 30 miles from the base. Those who had made the difficult climb told me they couldn’t see much of interest.

Under time and budget constraints, I opted to drive from Las Vegas and simply park just off Highway 375, northeast of Groom. The base was miles away, hidden behind rugged mountains, but that’s about as close as any outsider could get.

I had perused an old Air Force Security Police manual entitled *Det 3 SP—Job Knowledge*, which included rudimentary drawings and descriptions of field sensors—motion, acoustic, and other types—scattered around Groom. According to the manual, these battery-powered canisters were buried with their “flat end facing the roadway,” enabling them to de-

excited as those who had seen the dripper first-hand. I contacted physicists at the California Institute of Technology in Pasadena, who later watched the tape and decided our dripper’s shedding was “classic plasma bifurcation,” or the splitting of gas ions in the atmosphere. Fascinating, but why would an aircraft be shrouded in plasma? Was this a new type of stealth technology? If so, it must be of limited operational value, because at night, the aircraft, visible for miles, failed mis-



tect passing vehicles and set off alarms if anybody got close to the base.

I couldn't monitor activity at the base itself, but maybe I'd spot the sky-ripper departing for a late-night test flight. A near-full moon provided enough light to reveal an aircraft, if one were to take off that night. Hours went by, the moon climbed higher, but I saw nothing. The desert was dead quiet, and downright lonely. Around 2 a.m., fighting to stay awake, I suddenly felt the rental car rocking back and forth. I bolted upright. A short-horn steer was using the car's left-rear corner as a scratching post. About a dozen open-range cattle were clustered around the car, probably wondering why I had intruded on their pasture.

By 4 a.m., having seen or heard nothing departing Groom, I headed for a motel. Joining me the next night was a Las Vegas TV crew that was equipped with night-vision gear and a portable radio-frequency scanner. We had barely settled in for the evening when the scanner blared: "[Call sign], do you have the four-wheeler down by the mailbox?"

"Yeah. I got him," came a bored reply.

Across the highway from us stood a local rancher's black, post-mounted mailbox. The four-wheeler under discussion was ours. We hadn't been there a half-hour, and the "camo dudes"—what black-aircraft watchers call the camouflage-uni-

formed Groom guards—were already on to us. Maybe the presence of two reporters and a TV cameraman prompted the base's commander to cancel that night's tests. Or maybe Groom test pilots don't fly on nights when the moon is full and bright. For whatever reason, we saw nothing more exciting that night than lightning flashes from a distant thunderstorm.

**WHILE EMPLOYEES AT THE BASE** won't talk about classified aircraft or technologies, some have offered tidbits about what it's like to work there. Many of the workers live in the Las Vegas area and are flown to Groom on Boeing 737s. These aircraft, painted white with a nose-to-tail red stripe, ferry people and supplies to and from the base. Typically, workers fly to Groom on a Monday and back to Las Vegas on Thursday or Friday, although daily roundtrip flights are common.

Test pilots, managers, engineers, technicians, mechanics, and support personnel stay in base dormitories, which may have been upgraded in recent years. In the 1980s and 1990s, Groom's pilots lived in "old wooden World War II barracks with creaky floors," one told me. Each pilot had his own eight-by-eight-foot room, which boasted a single window—painted shut. Test personnel typically worked 14-hour days, almost exclusively at night. The base closely monitored satellite over-

flights—"both ours and theirs," one Groom engineer said. Test flights were scheduled to preclude a secret aircraft being photographed from space. As more countries launched military satellites and commercial imaging spacecraft proliferated, it became increasingly difficult to conduct flight tests in secrecy.

"Sometimes we'd barely get airborne, when we'd have to land to avoid a [satellite] overflight," one pilot told me. "Scoot shelters," portable carport-like structures, were positioned on the ramp to hide an aircraft until the satellite was out of range. Eventually, shelters were also positioned at remote airfields throughout the Nellis and adjacent Utah test and training ranges, for pilots who couldn't get back to Groom before a satellite topped the horizon.

Avoiding detection by satellites produced one innovation that also greatly improved flight test efficiency. Rather than land at Groom or another strip, pilots simply flew their aircraft beneath a KC-135 or -10 refueling tanker, shielding them from the satellites. Not only could a tanker serve as an airborne scoot shelter, it could refuel test aircraft as well, enabling more test points on a single sortie.

Groom Lake has also been rumored to hide captured alien spacecraft and their big-eyed, little gray-guy crews. Those convinced that unidentified flying objects come from other worlds are just as convinced that some are hidden in Groom's hangars. I've never seen anything to support that notion.

However, it's clear to me that the UFO phenomenon is used to protect the base's deepest secrets. I once was advised that if I wanted clues about real-world classified aircraft projects, I should read the supermarket tabloids. If a hiker spotted a new airplane during a test flight near Groom and talked about it openly, the story might appear in one of the tabloids—although wrapped in a wild tale, complete with grainy photos of flying saucers and alien beings. I once asked a Groom test pilot whether tainting classified-aircraft sightings with the UFO stench was ever done intentionally. He smiled and replied: "It's worked for 50 years. Why would we change now?" Without question, black-world operators have become masters of such deception to protect their work. As a result, Groom Lake will likely retain its secrets for a very long time. —



STEVE JACKSON, COURTESY OF SILENT HEROES THE COLD WAR NATIONAL MEMORIAL

Near the summit of Nevada's Mt. Charleston lies the wreckage of a C-54 that crashed in 1955, killing 14 contractors and CIA employees bound for Groom Lake.





# LOST IN SPACE

*Microgravity's mysterious side effect: Stuff disappears.*

*by Tom Jones*

*Illustration by David Clark*

**IT HAPPENS TO EVERYONE IN SPACE.** No matter how well you Velcro your pockets, how carefully you duct-tape an item to the bulkhead, or how tightly you pull the drawstring on your ditty bag, some vital piece of gear will go missing. Will you see it again? It's a toss-up. Anyone who has ever flown on the space shuttle will swear it was built by the same engineers who brought us the sock-eating clothes dryer.

In free fall, objects have an uncanny ability to escape, then evade a search. According to Don Pettit, who lived on the International Space Station in 2003, part of the problem is the terrestrial habit of looking for lost items down at your feet. "In weightlessness, this is not an effective search strategy," he says. "Even after months of living in space, the one thing I never lost was that reflex."

Don is right. On each of my shuttle missions, I'd occasionally lose my spoon, vital for digging morsels out of those packages of freeze-dried food at mealtime. *Dang!* I'd swivel my head frantically—down, up, left, right—finding only frustration. Hours later, the spoon would show up stuck on the cabin air cleaner's inlet filter, its sticky bowl coated with lint, hair, dandruff, lost M&Ms, and stray crumbs. Bon appétit.

Spacecraft interiors are complex, with all kinds of hiding places. On the third Spacelab flight, 1985's STS-51B, one of two squirrel monkeys on board got space sick, so the astronaut-doctors on board prescribed fresh bananas as the treatment. When the crew went to their fresh-food locker, the banana count was one short of the number that had been launched. With each banana critical, the astronauts scoured the flight deck and middeck for the missing fruit; pilot Fred Gregory even plunged his arm into the malodorous depths of the sub-floor "wet trash" compartment: No joy.

Finally, a whiff of overripe fruit led them to middeck forward, near the fresh-food locker. Pulling out the locker's 18-inch plastic tray completely, they spotted a gooey mass mashed against the cabin bulkhead. The banana had floated off the partially open tray and become trapped behind it; sliding the

drawer home crushed the fruit against the wall. To the crew's relief, one less banana didn't hurt the monkey's recovery.

The cabin air cleaner where I found my spoon hadn't yet been developed in 1989 when Sonny Carter flew aboard *Discovery* on STS-33. His wristwatch went missing, and the crew couldn't find it. Technicians back at the Cape had no luck either. But on *Discovery*'s next flight, Steve Hawley removed some flight deck panels for maintenance work and was surprised to find Sonny's watch, plus a pack of salt tablets and a hair brush. (I once found a "Go Air Force!" bumper sticker floating behind the same panels on *Columbia*.) Hawley informed mission control of his find. "I know the watch is Sonny's," he radioed smooth-scalped capcom Story Musgrave, Carter's crewmate on that previous mission, "but Story, is this brush yours?"

On a space station, there are even more places gear can hide. Norm Thagard, who launched to the Russian Mir station in 1995, was cleaning his electric razor when the spring-loaded floating heads got away. Although he regularly searched the air intake in the Mir base block, his razor parts were gone for good, lost somewhere amid the equipment cramming Mir's basement-like interior. For the next four months, he shaved with the Soviet-issue cosmonaut model. Mir's dimly lit recesses also claimed Thagard's foot-long "sharps" canister of discarded needles and syringes, used to draw blood.

Conducting a biotechnology experiment on the ISS in late 2001, Carl Walz put on bulky thermal gloves, delicately extracted 31 frozen cell cultures from a chilled container, and stuck each vial to a strip of duct tape on the walls of the U.S. Destiny laboratory, where they were supposed to thaw before injection into growth chambers. But an inadvertent nudge sent the vials flying; they ricocheted off all four walls and into the adjacent Unity node. "I scrambled to chase them down," Walz says, "but one vial escaped 'the great biotech roundup.' It just never turned up." Fortunately, he was able to complete the experiment without the missing sample, and





no radiation-altered strain of Green Slime has started to ooze from behind Destiny's panels—yet.

The dozen or so High-Efficiency Particulate-Absorbing (HEPA) filters built into the baseboards of the ISS modules sometimes trap drifting equipment as they screen circulating cabin air. But sometimes a prayer to St. Anthony, patron saint of lost articles, is more effective. In December 2008, Sandy Magnus was bolting the front panels to a new sleeping compartment in the ISS Harmony node. She held the four bolt assemblies and a tiny Allen wrench securely in her fist while she took a call from mission control. When she went back to work, she recalls, "I slowly opened my fingers to continue—but the wrench was gone!" (According to Magnus, "Whenever you see an astronaut start whipping their head around on camera, you can be sure they've lost something.")

Figuring the tool was gone for good, she used duct tape to attach the wall panels. But two days later, working in the European Columbus lab, she spotted the tiny black wrench adrift near the ceiling. It was the rare case of a missing tool turning up later.

Magnus notes that whenever crew members find floating odds and ends, they pop them into a Ziploc lost-and-found she calls the "scavenger hunt" bag. Occasionally the crew will downlink photos of its contents to the ground, where engineers will try to figure out where the mystery widgets came from. Controllers say that of the 22,000 inventory items currently logged aboard the ISS, 638—just under three percent—are listed as misplaced or lost.

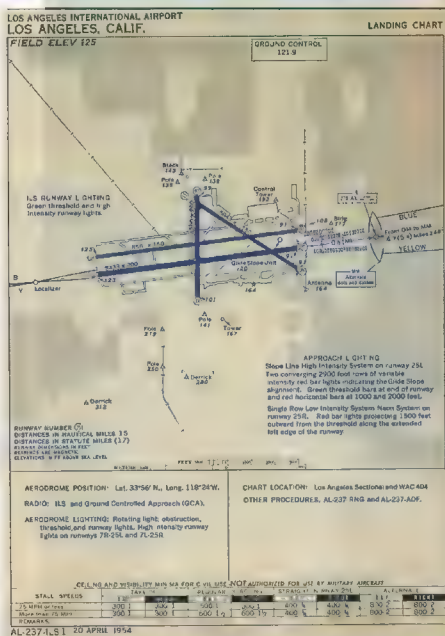
Houston: Jones here. Let me know if someone on the ISS spots a 3/8-inch socket wrench. On February 11, 2001, while unbolting launch locks in the new Destiny lab, I took my eyes off that tool for a second....

Ask me about the reward. ➔



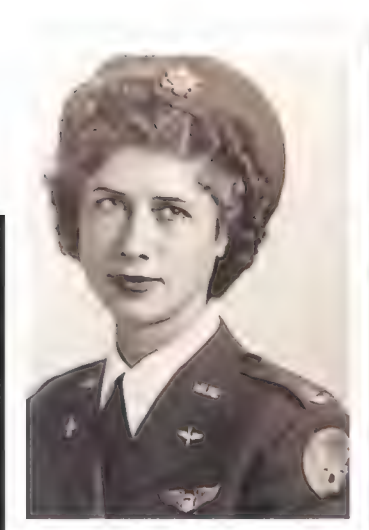
# COLD CASE

*A new team sets out to solve old disappearances.*  *by Michael Behar*





**ON THURSDAY, OCTOBER 26, 1944,** 12-year-old Frank Jacobs did what he always did when school got out: He walked a half-mile to the Manhattan Beach pier, where he liked to fish for halibut. Jacobs settled in a spot on the pier's north side, which gave him a view of aircraft departing from Mines Field (now Los Angeles International Airport), about three and a half miles south. He loved catching a glimpse of an American fighter.



During World War II, Gertrude Tompkins (above) flew a P-51 like the one at left out of Los Angeles' Mines Field (far left) and into the history books: She is the only WASP still unaccounted for. Now a group of searchers is on the case. Their October 2009 dive in Santa Monica Bay turned up an engine encrusted with sea life – but it was a Cessna 210's, not a P-51's.

OPPOSITE LEFT: COURTESY ROBERT HYMAN; MIDDLE: NASM 7A35628-A; TOP: COURTESY LAURA WHITTALL-SCHERFEE; BACKGROUND: ROBIN JACOWAY/COURTESY ROBERT HYMAN

Airplanes departing Mines usually head west, over the bay. And that autumn afternoon was no different: Jacobs noticed the roar of a single-engine airplane climbing over the water. Though the boy built balsawood models of aircraft used in World War II, he could not identify this airplane. But he suspected it was a P-51 Mustang.

Suddenly something odd happened.

"There was this sputtering sound and then total silence," recalls Jacobs. He watched stunned as the aircraft pitched upward, then pitched nose down and began falling. Jacobs alerted three bystanders, but none seemed concerned. Seconds later, the aircraft disappeared silently into the fog.

Jacobs climbed onto the pier railings and strained to get a better look. "I don't even know if it went in the water because the cloud deck was so low," he says. "But I assume it couldn't have pulled up because there was no more engine noise."

Jacobs spoke to a nearby shopkeeper, who said if there had been an accident, the authorities knew about it. The boy went home and told his father; "He didn't believe me either."

Several days passed; the newspapers reported nothing. Months went by, then years.

In 2005, Jacobs was reading the *Daily Breeze*, a South Bay paper in Los Angeles, and saw a story that finally identified what he had seen that day. It was indeed a P-51D Mustang, factory-fresh, and the pilot was a woman, Gertrude Tompkins.

Tompkins, 32, had been flying for the Women Airforce Service Pilots, a World War II program that enlisted 1,074 women to ferry military aircraft, primarily between U.S. military bases. She had been part of a flight of three Mustangs headed

to Newark, New Jersey, on a hopscotch route that would take four days. But her canopy had a locking problem, so her two fellow pilots took off without her, flying over water and then banking left, toward Palm Springs. Tompkins took off a few hours later, following the same flight path.

When the first two pilots arrived in Palm Springs and didn't see Tompkins, they assumed the canopy malfunction had grounded her. But after landing in Newark, they learned that nobody had seen or heard from Tompkins.



JOHN MUNSON/THE STAR-LEDGER

**Mike Pizzio, an underwater searcher with the FBI, volunteered as dive leader for the Tompkins search.**

For three weeks, crews searched Santa Monica Bay and the surrounding area for Tompkins' Mustang. They turned up nothing, and eventually called off the search. Tompkins was the only WASP who disappeared and was never found.

Jacobs called the reporter who had written the *Daily Breeze* piece, Ian Gregor, who put him in contact with Pat Macha of Aircraftwrecks.com, a historian of aviation accidents. Macha had been collecting evidence on the Tompkins case for years and had organized searches for her airplane.

Macha and Jacobs went to the pier, and



Jacobs pointed out where he had seen the aircraft fall. “The memory has always haunted me,” says Jacobs, now 78 and a retired aerospace engineer for Northrop Grumman. “I have always felt that somebody died that day.”

Now another search for Tompkins is on. This one is being led by a group of volunteers called the Missing Aircraft Search Team. With a diverse set of specialized skills, MAST’s members hope to locate long-lost aircraft and, in some cases, the remains of the pilots and passengers.

In the United States, there are more than 180 cold cases involving civilian aircraft that have gone missing, plus an uncalculated number of military airplanes that

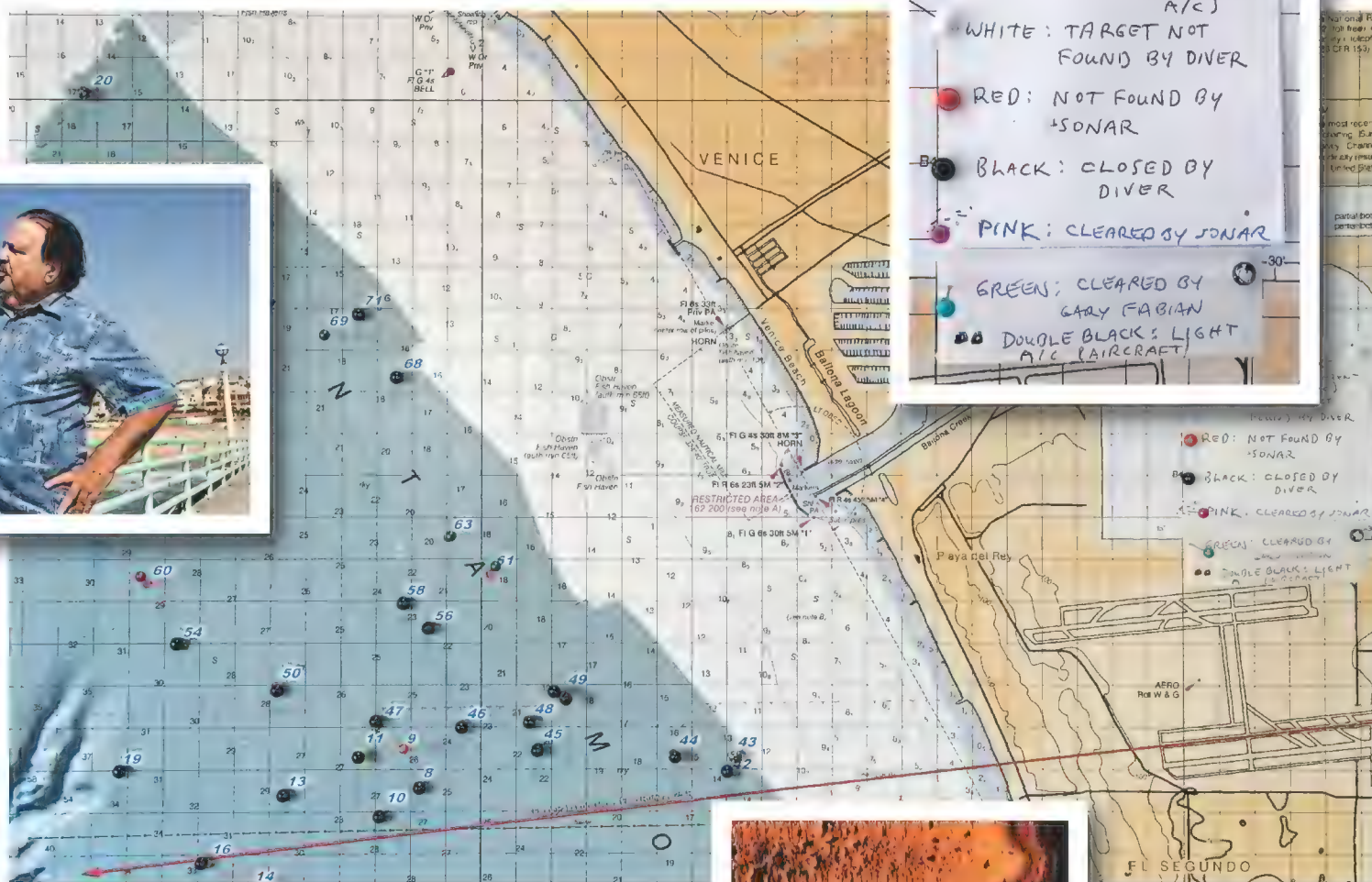
Hoping his camera will capture a glint of metal protruding from the sandy bottom, Meistrell steers the *Disappearance* in tight circles. We’re two miles west of LAX; departing jetliners pass overhead nonstop. It’s a pleasant fall morning, and calm seas make for ideal search conditions.

MAST’s origins go back to early 2008. One of its members, Robert Hyman, a photographer, explorer, and mountaineer who has led expeditions, had been following the news reports on the search for Steve Fossett, a wealthy aviation record-breaker who had disappeared in September 2007 (see “Anatomy of a Search,” Feb./Mar. 2008). Like Fossett, Hyman is a fellow of The Explorers Club. “When they couldn’t find

winds, tides, and currents, then recommend where searchers should focus their efforts. While SAROPS is designed for ocean operations—its models located wing debris and bodies from Air France Flight 447, which crashed off the coast of Brazil in June 2009—Keller used the methodology, along with Google Earth satellite photographs, to reconstruct several possible scenarios for Fossett’s last flight. She then ranked the routes in order of probability.

Next, Hyman recruited 28 searchers, and in September 2008 the team spent two weeks scouring the mountains near the

**Frank Jacobs**  
recalling the doomed  
P-51’s path (below);  
an old map of Santa



**Monica Bay with**  
MAST’s dive targets  
(right); sonar image  
of T-33 debris found  
in the bay – an old  
mystery MAST  
inadvertently helped  
solve.

have disappeared. MAST considers taking a case when asked by family members of the missing, or by the agency with jurisdiction over the disappearance.

**IT IS EARLY OCTOBER 2009**, and I am staring at a TV monitor relaying live images from a video camera being dragged along the bottom of Santa Monica Bay in search of Tompkins’ P-51. Next to me on the bridge of his yacht, *Disappearance*, is Bobby Meistrell, the 81-year-old co-founder of Body Glove, the company that developed the modern-day wetsuit. Meistrell has volunteered his boat and submersible camera for the search.

Steve, I said to myself, ‘I could put a climbing team together to help the official searchers reach some of the extreme vertical terrain where he might have crashed,’” Hyman says.

He tapped Lew Toulmin, a disaster response manager who has consulted for the World Bank and U.S. Agency for International Development, and Colleen Keller, a senior analyst at the scientific consulting firm Metron. Working for the U.S. Coast Guard, Metron had created SAROPS (Search and Rescue Optimal Planning System), which can examine



Flying M Ranch in Nevada, Fossett’s last known point of departure. The group failed to find Fossett’s Bellanca Super Decathlon, but one of the tracks they identified with radar data from his flight passed over

the spot where the famed aviator’s remains were later discovered.

“We all bonded during the experience,” says Hyman. For him, the search planted a seed: A team of search-and-rescue sleuths



armed with the latest technology and schooled in advanced search methods could potentially solve some of history's aviation mysteries.

The new group decided to make its first case a Cessna 182 carrying Marcy Randolph, 43, and pilot William Westover, 54, that had vanished in 2006 on a sightseeing flight from Phoenix to Sedona, Arizona. The members gathered data—radar tracks, cell phone records, satellite images—and made plans to conduct both air and ground searches. Keller assembled a report with 14 scenarios describing how and where the Cessna might have crashed. Rather than investigate all of them, she asked MAST members to rank each sce-

resolution sonar data in preparation for the Tompkins search, MAST, working with two other search groups, UB88.ORG and Aircraftwrecks.com, located debris on the ocean floor later identified as parts of a Lockheed T-33A Shooting Star trainer that had disappeared in 1955 with two Air Force lieutenants in it. (The parts have since been retrieved by the local sheriff's department.)

MAST members have paid for expenses themselves. The Tompkins search easily exceeded \$30,000, and had volunteers charged for their services, the cost would have been well over \$1 million. The group is in the process of becoming a non-profit, able to accept donations for searches.

who helped coordinate the dive volunteers, I learn a little more about the pilot: Born in 1912 and raised in a quiet New Jersey suburb, she was the third of three girls. After getting an undergraduate degree from the Pennsylvania School of Horticulture, she met a pilot, a Brit living in the States. They fell in love and became engaged, and he taught her to fly. Tompkins stuttered, says grand-niece Laura Whittall-Scherfee, but the stuttering stopped after she learned to fly. When the war began, her fiancé joined the Royal Air Force, and was later shot down over England and killed. By then Tompkins had caught the flying bug, so in 1943 she joined the WASP. She married a movie producer named Henry M. Silver (though did not take his name) a month before she disappeared.

To identify the most promising dive sites, Gary Fabian of UB88.ORG had acquired a scan of Santa Monica Bay the U.S. Geological Survey (USGS) had produced in October 1996 with a multi-beam echosounder, a device that showers the ocean floor with sound pulses. The returns from the pulses render a three-dimensional snapshot, similar to a topographic map. From the scan, Fabian winnowed more than 55 elevations that might be remnants of Tompkins' P-51.

While the multi-beam had good enough resolution to establish targets, it could not tell the searchers what the targets were. "We used the side-scan to create a better image," explains Gene Ralston. Ralston and his wife, Sandy, are renowned for their mastery of the side-scan sonar, which generates high-resolution images of objects on the seabed. The sonar, which resembles a Sidewinder missile, mounts to the bow of the Ralstons' 23-foot aluminum skiff. Gene uses a winch to lower the device into the water until it is hovering about 10 feet above the bottom. It is coupled to a 1,000-foot cable that relays the sonar data back to the operator. The boat motors slowly, towing the sonar.

In saltwater, "things that might survive include the machine guns, the engine—especially the crankshaft because it is very hard metal—seat armor, and wheels," Toulmin says. Because of the scan's high resolution, says Ralston, "we can detect things as small as a beer can, and under the right conditions"—like the ones in the bay, where the water is very clean and the packed-sand bottom is smooth for



ROBIN JACOWAY/COURTESY ROBERT HYMAN

**Robert Hyman helped search for fellow adventurer Steve Fossett. The undertaking inspired him and other Fossett searchers to create MAST.**

nario's likeliness on a 1-to-10 scale. On April 13, 2009, Chris Killian, a telecommunications executive and wreck hunter who has discovered more than 100 military aircraft, called the U.S. Forest Service to find out whether the group needed hiking permits to access the most likely sites. "While he was on the phone, it occurred to him to ask for fire reports," says MAST co-founder Tim Evinger. Killian learned that the day the Cessna had gone missing, hikers passing by one of Keller's scenario sites had reported a fire; they had even taken a photograph of it. "Lo and behold," says Evinger, "[the airplane] was there."

In April 2009, while examining high-

The group has 12 members. If a search is under way, MAST will use mission-specific experts. For the Tompkins search, the crew includes sonar technicians, commercial divers, sport fishermen who know Santa Monica Bay well, a cave cartographer, an off-duty FBI agent, and a guy who inspects the water outfalls at nuclear power plants (he's particularly adept at squeezing into tight spaces, underwater, in the dark). In all, more than two dozen volunteers, including members of UB88.ORG and Aircraftwrecks.com, have come from around the country to participate, including three members of Tompkins' extended family.

From talking to them, and to Pat Macha,





miles—“things stand out really easily.”

The Ralstons also own a remotely operated vehicle, about the size of a small beach cooler, that carries a video camera. If the sonar picks up something promising, Gene can deploy the tethered ROV to get a quick peek at it. But the ROV has limitations—it is slow, and ocean currents make it hard to steady—so during the Tompkins search, the targets are investigated by scuba divers, who make numerous descents into the 45-degree-Fahrenheit water. By the end of the first day, divers had found a 1950s wooden powerboat, an anchor, and a pair of washing machines full of lobsters. So far, no Mustang.

Because MAST cannot take every cold

the head of the privately funded Fossett search, used his skills in cell phone forensics to help solve the Cessna case. One of the two people aboard the aircraft had been carrying a cell phone; Evinger correlated data from the service provider with one of many unidentified aircraft radar tracks in the region. The association helped MAST narrow the search area.

Radar tracks made minutes before a crash can provide vital clues to the aircraft's general vicinity. The problem, says Evinger, is that radar data isn't always archived.

Emergency locator transmitters—and newer devices called personal locator beacons and SPOT Personal Trackers—can tell a satellite your location within a few

survived the June 1973 crash in the bay, and MAST interviewed them.) The second are drainage plugs from an airplane fuel tank. They have part numbers, and MAST is continuing to research them.

In seven days, 12 divers, reaching depths up to 270 feet, clear 44 targets. They find boulders, orange highway cones, lobster traps, a sailboat, a mysterious metal box, and a 30-foot-tall telecommunications antenna. Gene Ralston conducts a second pass with the side-scan sonar, ruling out the remaining targets.

MAST did not locate the Mustang. Is it possible the searchers missed it? MAST's Hyman has doubts: “Divers always say that items on the ocean floor tend to displace



LEFT: REUTERS/MONO COUNTY SHERIFF'S COUNTY SAR; RIGHT: COURTESY ROBERT HYMAN

**Left: The ruins of Fossett's Bellanca Super Decathlon. Below: A photo taken by hikers shows a burning Cessna 182 (orange dot in circle) relative to findable landmarks forming a triangle.**



case, it focuses on the most promising candidates. For the oldest cases, eyewitness reports are essential. But for more recent incidents—those in the past 10 or 15 years—technology plays a larger role. Before taking a case, MAST members want to know whether anyone in the missing airplane carried a cell phone, and whether its data are still available. Because cell phones must always be ready to place a call, they maintain reception by regularly emitting pings to nearby towers, a process that is tracked and recorded by service providers. MAST's Tim Evinger, the sheriff of Klamath County, Oregon, and

yards. Data emitted from any of these gadgets can lead searchers to a missing aircraft. But pilots are not required to carry them.

Evinger muses about a day when airplanes and passengers are so wired that getting lost simply won't be possible. In the future, he says, our activities will always leave an electronic trail.

**DAY TWO OF THE SEARCH.** Two finds are intriguing: The first is a general aviation aircraft from which divers recover an instrument panel. (It was later identified as part of a Cessna 210C. Both occupants

current and sediment deposits, leaving them exposed, if large enough—like the T-33 plane we located.”

But Rikk Kvitek, director of the Seafloor Mapping Laboratory at California State University at Monterey, e-mails me that in Santa Monica Bay, there has been “significant deposition of fine sediments in the 1900s. This could easily cover and/or obscure the low-relief wreckage of a small aircraft.” Pete Dartnell of the USGS in Menlo Park, California, has measured the depths of Santa Monica Bay, and agrees: “This is a dynamic environment with the potential to bury small wreckage.”



MAST's Colleen Keller thinks it is "highly likely that the wreckage is buried. For a while we were discussing trying to involve U.S. minesweeping assets to search the near-shore area for wreckage just beneath the surface. Deeper water would present more significant problems. These are highly localized sensors...the veritable needle-in-the-haystack situation."

It's possible, too, that the Mustang is in a less likely part of the bay, outside the 60-square-mile zone that MAST, deeming it the most promising, chose for the search.

Or it may not be in the bay at all. That's the theory of 87-year-old Duncan Miller, who dated Tompkins while he was attending fighter pilot school. Miller, who

watched that silver airplane fall from the sky. Even so, at the end of the dive, Laura Whittall-Scherfee was grateful to MAST for eliminating so many targets, saying: "Although Gertrude's Mustang continues to elude us, you brought us ever closer to our target."

MAST does not promise to solve every case it takes on. Limited in time, technology, money, and number of volunteers, it does what it can, and if further work looks unpromising, it will move on. The group is now investigating the case of retired commercial airline pilot Court Mumford, who left Aurora State Airport in Oregon on July 7, 2007, in a Sport Cub and never returned. Killian wants to look for Carroll

generating a 3D image of what the pilot saw along his or her known (or presumed) route before the airplane went down. MAST tested the software for NASA during its Fossett search. "We would take a canyon and we'd be able to see a notch Steve might have gone through that isn't perceptible just looking at a map," Toulmin says.

Gene Ralston looks forward to the next generation of side-scan sonars, which boast far better resolution. He is also stoked about autonomous underwater vehicles, or AUVs, essentially submersible robots that can operate untethered at virtually any depth with no input from controllers at the surface. They have an onboard computer guidance system and collision avoidance sensors, and can be equipped with side-scan sonar, high-definition video, still cameras, and image processing software. A team of wreck hunters from the Waitt Institute for Discovery recently used two AUVs to look for Amelia Earhart's Lockheed 10E Electra. They programmed the devices to search 7,000 linear miles of ocean floor near American Samoa at an average depth of 17,000 feet.

Ralston speculates that future drones could be used to search for aircraft on the ground. Instead of being directed by a controller and a joystick, the craft would essentially think for themselves. "They could fly over an area looking for specific colors, like a piece of clothing, and then analyze the image," Ralston says.

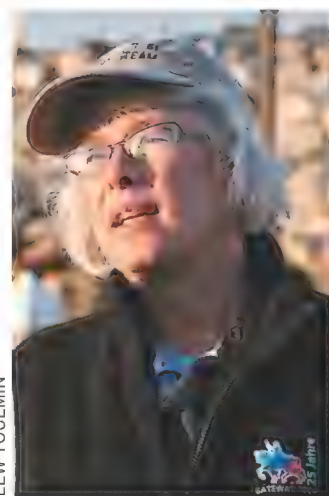
For now, Hyman has more modest dreams. "The [Tompkins] search still has legs," he says, "and we want to go back [to the bay] with a small footprint"—perhaps one boat, a side-scan, and a couple of divers. The UB88.ORG and Aircraftwrecks.com teams continue the search as well, and now the Navy is assisting. But even if P-51 parts are found in the bay, after 60-plus years, any evidence they once bore showing why the aircraft went down may be long gone, leaving part of the Gertrude Tompkins mystery still unsolved. 



**The divers turned up a fuel tank plug (left), still being researched, and a piece from an airplane instrument panel. MAST identified the Cessna 210C from which the piece came and located the occupants, who had survived the 1973 crash.**

and Ruby Webb and their son William, who disappeared in 1967 in a Piper Cherokee flying from San Jose, California, to Ogden, Utah. Meanwhile, the Ralstons are making preparations to use their side-scan sonar in Flathead Lake, Montana, where, in 1960, Captain John Eaheart, a pilot with the U.S. Marine Corps Reserve, crashed his Grumman F9F Cougar.

MAST members are always eager to try the latest wizardry. Lew Toulmin tells me about NASA World Wind, software that, among myriad other functions, can put a searcher in the cockpit of a lost aircraft,



**Watching the bay dives: Tompkins' grand-niece, Laura Whittall-Scherfee.**

remembers Tompkins as "a very nice, high-class girl" and "very stable," says, "It is my feeling that she crashed in the mountains east of Los Angeles." His reasoning: Pilots hate flying over water because an emergency landing is much more difficult, as is survival afterward. Miller's scenario would explain why young Frank Jacobs never heard a splash when he



# DEPARTMENT OF

## HELLO? UFO DESK? I'M CALLING TO REPORT A... BY CRAIG MELLOW

**JANUARY 2009.** Police in the western French province of Brittany are puzzled by a wave of reports that strange, undulating lights have been drifting across the night sky. They call for a national operative who works out of a small, unmarked office in the southern city of Toulouse. He arrives on the scene swiftly and begins making subtle inquiries, wary as always of spreading panic among the public.

The investigator in this real-life Gallic version of “The X-Files” is Yvan Blanc, a diminutive, balding, 57-year-old engineer who bears a striking resemblance to former Soviet leader Mikhail Gorbachev. Until last year, Blanc was a project manager helping launch the European Space Agency’s Herschel Observatory, a job he thought might cap a three-decade career at the French national space agency CNES. Then he got an unexpected offer: to head up the Group for the Study and Information on Unidentified Aerospace Phenomena, or GEIPAN—the French government’s UFO office.

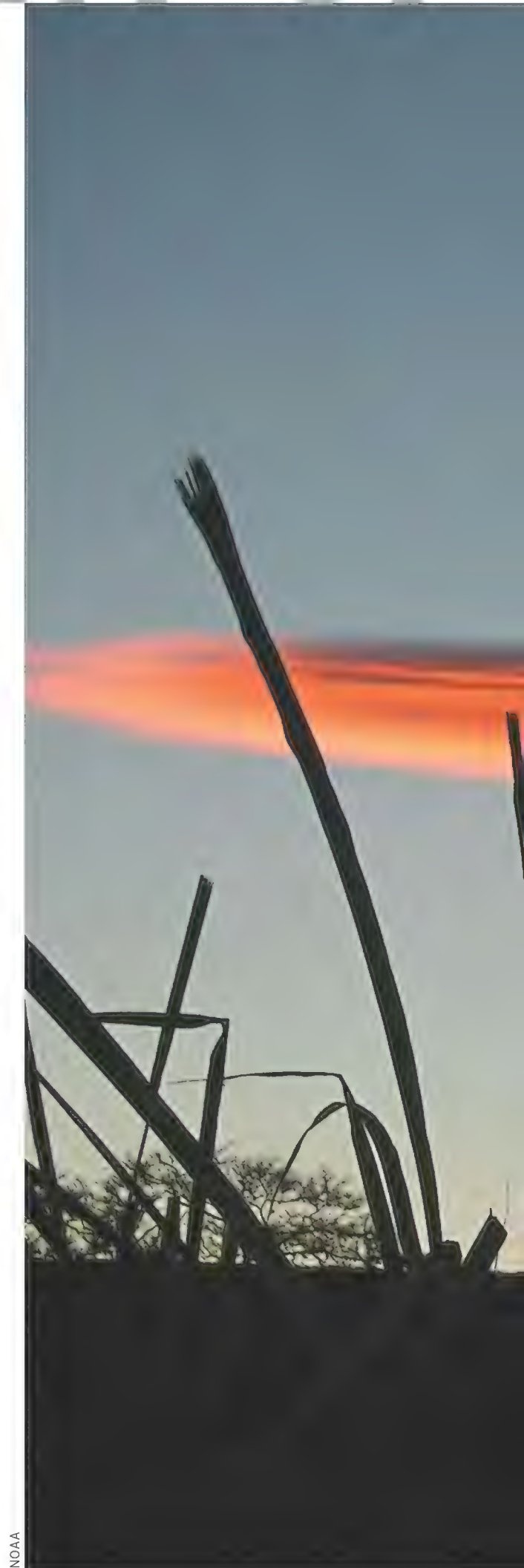
The first flying saucer sighting is generally credited to a hobbyist pilot in Washington state, who reported seeing a fleet of nine in 1947, and ever since, the vanguard of the cosmic imagination has been occupied by the United States. But the U.S. government closed the book, literally, on official UFO studies in 1969, when outside researchers reviewed 22 years of sightings in the Air Force’s Project Blue Book and found none that could be traced to either the Communist Bloc or extraterrestrials. Not so other countries. Well beyond the

1970s, governments from Uruguay to the U.S.S.R. kept some sort of tabs on unexplained airborne apparitions. The most systematic and long-lasting programs were sponsored by Britain and France.

Beginning in 1959, the U.K. Air Ministry and later Ministry of Defence (MoD) logged more than 11,000 UFO reports—until the MoD finally shuttered its monitoring program in 2009. France started later, establishing GEIPAN’s predecessor in 1977, but still carries on, though the agency’s staff has shrunk from a dozen to just Blanc and a secretary. Both countries published their UFO records recently after decades of secrecy, drawing enormous public interest. GEIPAN posted files online in 2007, and the first day they were up, the Web site crashed. The United Kingdom emptied MoD’s filing cabinets into the National Archives, and over two years or so, the digitized bits have been downloaded two million times. That swamps the archives’ former greatest hit, the Domesday Book, which catalogued taxable property transactions in England after the Norman Conquest.

The new wealth of official information has lent substance to the longstanding debates over how to identify the unidentifiable. The newly declassified document piles have forced the hardest-headed researchers to admit that, strictly speaking, unidentified aerial phenomena *do* exist. Pilots and other legitimate witnesses have sworn to, and radar at times has confirmed, heavenly anomalies that cannot be readily explained. But the French and British

**Lenticular clouds tend to remain stationary; their longevity and their saucer-like appearance sometimes lead to misidentification as otherworldly spacecraft.**



NOAA



# FLYING SAUCERS





**A full moon on a gloomy night, movies about space aliens – UFO sightings are driven by suggestive images, says journalist David Clarke.**

files also confirm that if alien civilizations have probed our planet, they have been pretty darned subtle about it.

One UFO obsessive who resists belief in ETs is David Clarke, a journalism professor at Sheffield Hallam University in the English Midlands whose relentless freedom-of-information requests helped unseal the MoD's vaults. He now acts as the National Archives' official expert on the vexing phenomenon. "I've been involved in the investigation of UFO reports, firstly as an enthusiast and later during my career as a journalist. I defy anyone to do this for over 20 years and emerge anything other than skeptical," he exclaims during an interview at a distinctly down-to-Earth pub across the street from the university's campus.

What the government's papers prove, Clarke explains, is that garden-variety UFO

sightings are heavily driven by banal suggestion. They peaked when *Close Encounters of the Third Kind* hit British screens in 1978, and again in 1997 with the release of *Independence Day*. Clarke thinks better-documented visions likely stem from rare weather manifestations such as ball lightning—spheres that can shoot through the sky for minutes at a time—and red sprites, which appear above thunderclouds when lightning flashes beneath.

But not everyone who worked behind the UFO curtain entirely agrees. Nick Pope was a career MoD bureaucrat who from 1991 to 1994 fielded celestial weirdness reports in the Secretariat (Air Staff) office overlooking 10 Downing Street; he passed the juicier ones on to a military intelligence subdivision known as DI55. Some of the reports, he says, forced him to keep an open mind to the possibility of visitors

from other worlds, most notably a night in March 1993 when more than 30 separate observers reported an object akin to "two Concorde flying side by side and joined together" flying at a leisurely pace across England for six hours.

"I'm not a fully paid believer in little green men, but some cases do give you pause for thought," Pope muses during a conversation in a London coffee shop. "Conventional science feels very uncomfortable with UFOs because they involve studying something that is no longer there." (Clarke argues that the 1993 sightings were simply a Russian rocket reentering Earth's atmosphere.)

Jean-Jacques Velasco, who for 21 years sat in Blanc's chair at GEIPAN and its predecessor organizations before leaving in 2004, strays much farther than Pope into green man territory. "Artificial and controlled objects have appeared in our atmosphere without any question," he concludes. "UFOs are phenomena with a





deliberate behavior, often traveling at incredible speeds. If they are artificial probes, they cannot be of terrestrial origin." Velasco's working hypothesis, it becomes clear, is that the best-documented UFO reports correlate with nuclear weapons tests in the decades after World War II. Therefore benevolent aliens may be warning mankind against its dangerous folly.

Amid such passions, Yvan Blanc does his best to remain calm and unbiased in his unexpected new specialty. UFO reports still pour in daily either from *gendarmes* on the beat or a network of 100 volunteer investigators that GEIPAN established in 2008. "Witnesses are emotional. That is the main difficulty," Blanc observes in labored but precise English. "It is hard to tell what they saw."

Blanc files away four out of five sightings without leaving CNES' modernist Toulouse campus by consulting air traffic patterns and the sky chart for the night in question. "What has surprised me most

in this job is people's ignorance of astronomy," Blanc notes dryly. "It's amazing how many people think they have seen a UFO when it is just the planet Venus." (That's exactly what happened across the Atlantic to a pre-presidential Jimmy Carter, who reported the glow from the second planet to Blue Book investigators in 1973.)

But GEIPAN does classify 23 percent of sightings as "unidentified phenomena," and last year, about 10 cases were puzzling enough to lure Blanc out of his chair for on-site investigations. GEIPAN works in conjunction with the French air force, civil aviation authorities, the French national police force, and meteorological offices. Most of the UFO reports Blanc receives come from one of these sources. When a report arrives, Blanc consults his

**The French and British files confirm that if alien civilizations have probed our planet, they have been pretty darn subtle about it.**

extensive advisory board, made up of astronomers, air traffic controllers, and military personnel, and if there is no immediate explanation for a sighting—aircraft being tested, an especially bright planet—Blanc decides whether to launch an investigation.

In the GEIPAN director's office, a modest wall of fame displays photos of some of these mysteries. All have been solved without recourse to the extraterrestrial. The eerie lights over Brittany turned out to be Chinese lanterns, mini hot-air balloons powered by candles, whose release has become a fad at European rock concerts and the like. A bizarre apparition that looked like a circular light over Marseille proved to be a window reflection after an unusual snowfall in that Mediterranean port. A weird backyard crop circle was traced to a rare microscopic mushroom that burns holes in the ground overnight. A Klingon-ish aircraft seen floating menacingly above the roofs of Paris was simply a large balloon released at a rugby match the same afternoon. And so on.

Yet deeper in the GEIPAN archives, there are mysteries for which Blanc has no explanation. In France's most famous UFO case, a resident near the southern vil-

lage of Trans-en-Provence reported in 1981 that an oval craft some eight feet in diameter landed briefly on his land and left abrasions. GEIPAN's investigation concluded that something had, in fact, been there: A "large-size event had indeed occurred." And an analysis of surrounding alfalfa plants showed them to have chlorophyll levels inexplicably below normal.

Blanc's second example of unsolved enigma is even stranger: a 1967 incident near Cussac in rural France in which a young brother and sister out herding cows reported four meter-high "devils" levitating into a spacecraft across a field. Asked whether such testimony could be credible coming from children aged 13 and 9, he replies, "We assume that witnesses are telling the truth about what they saw."

In any case, he keeps an artist's lyrical rendering of the alleged Cussac visitors disappearing into a blazing bright ship next to his own case memorabilia on the wall.

Almost as soon as man learned to fly, he began spotting unidentified flying objects. During World War I, Britons panicked over sightings they believed to be German Zeppelins (see "Fear of Floating," June/July 2009). World War II pilots regularly reported encounters with silvery balls of light that they called foo-fighters, whose origins were never conclusively explained. But it took the cold war and, later, the dawning of the Space Age, to turn UFOs into a popular obsession, and an object for systematic state scrutiny.

In the early 1950s, the fever spread quickly from the United States to the United Kingdom, reaching even an aging Winston Churchill. "What does all this stuff about flying saucers amount to?" the prime minister asked his air force chief in a note in the summer of 1952. "What is the truth?"

Churchill was informed that the Air Ministry had in fact convened a top-secret Flying Saucer Working Party two years earlier, which concluded that all the reports amounted to natural phenomena imaginatively interpreted. That assurance was partly revised in September 1952, when a squad of Royal Air Force airmen in Yorkshire reported a strange white-silvery object tailing a Gloster Meteor fighter back to base after maneuvers, then suddenly shooting off to the west at "in-



credible speed.” The Air Ministry set up a detail in its intelligence branch to keep track of such reports in the future.

The mission of the “UFO desk” was always restricted to watching for military threats. But reports from the public inevitably offered broader theories about unaccountably stealthy alien visitors. Toward these sightings, the ministry adopted a policy of being, as one now-unearthed internal memo put it, “politely unhelpful,” and kept it up for more than half a century. Once locked in dank cabinets, stacks of these bland assurances can now be perused by anyone at the National Archives’ airy research center in the South West London suburb of Kew. “The Department does not dismiss the possibility that intelligent life could exist in outer space,” reads a typical 1978 missive to Mr. T. Butler of the Bradlington Constituency Conservative Association. “But no evidence has reached the MoD to date to suggest that UFOs have extra-terrestrial origins.”

Occasional inquiries from Parliament gave long-suffering UFOcrats the chance to vent a bit. A certain Earl of Clancarty, a true believer who demanded a House of Lords investigation into spacemen incursions that, to his way of thinking, stretched back to at least the Biblical star over Bethlehem, particularly tried MoD’s patience in the late 1970s. “If they have not attacked for the last 2,000 years, it is doubtful whether the earl’s evidence could justify diversion of Defence resources just at present,” ministry spokesman T.M.P. Stevens wrote to another interested peer.

Weird flying stuff was just as fascinating in the Soviet Union. Authorities reacted there too, though typically in a jumbled fashion that their Russian successors have disclosed only in bits and pieces. The extant Soviet UFO trail starts in 1968, when a group of 13 senior air and space engineers worked up the courage to write a letter to No. 2 leader Alexei Kosygin, proposing a committee to study the issue. They learned to their surprise that the Politburo was already on it. “Questions about the nature of so-called flying objects have been considered by an array of competent organizations including the

USSR Academy of Sciences and the Ministry of Defense,” a scientist on Kosygin’s staff wrote back. “There is no necessity to create any sort of special organization.”

Little is known to this day about what the academy and the Soviet military considered. But UFOs were more enthusiastically studied in the late 1970s by Yuri Andropov, longtime head of the KGB and, for a brief term at the end of his life, supreme Soviet leader. Andropov aide Igor Sinitsin recalled approaching his boss gingerly in

**“What has surprised me the most in this job,” says Yvan Blanc, “is people’s ignorance of astronomy. It’s amazing how many people think they have seen a UFO when it is just the planet Venus.”**

1977 with a Western magazine report about a “giant jellyfish” widely witnessed in the skies over the northwest Russian city of Petrozavodsk. Andropov stunned his subordinate by pulling out a UFO dossier that he had been quietly compiling with help from the counter-intelligence directorate. (The jellyfish was later linked to exhaust gases from a secret rocket launch.)

From that year forward, the KGB kept tabs on the more spectacular airborne mysteries reported across the Soviet Union. In 1984, Soviet pilots in two fighters and an attack helicopter chased and fired on an intruding UFO from along the Caspian Sea border. One report has the unknown craft taking evasive action—diving to 320 feet to thwart the jets, then ascending beyond the helicopter’s range—but eventually retreating out to sea.

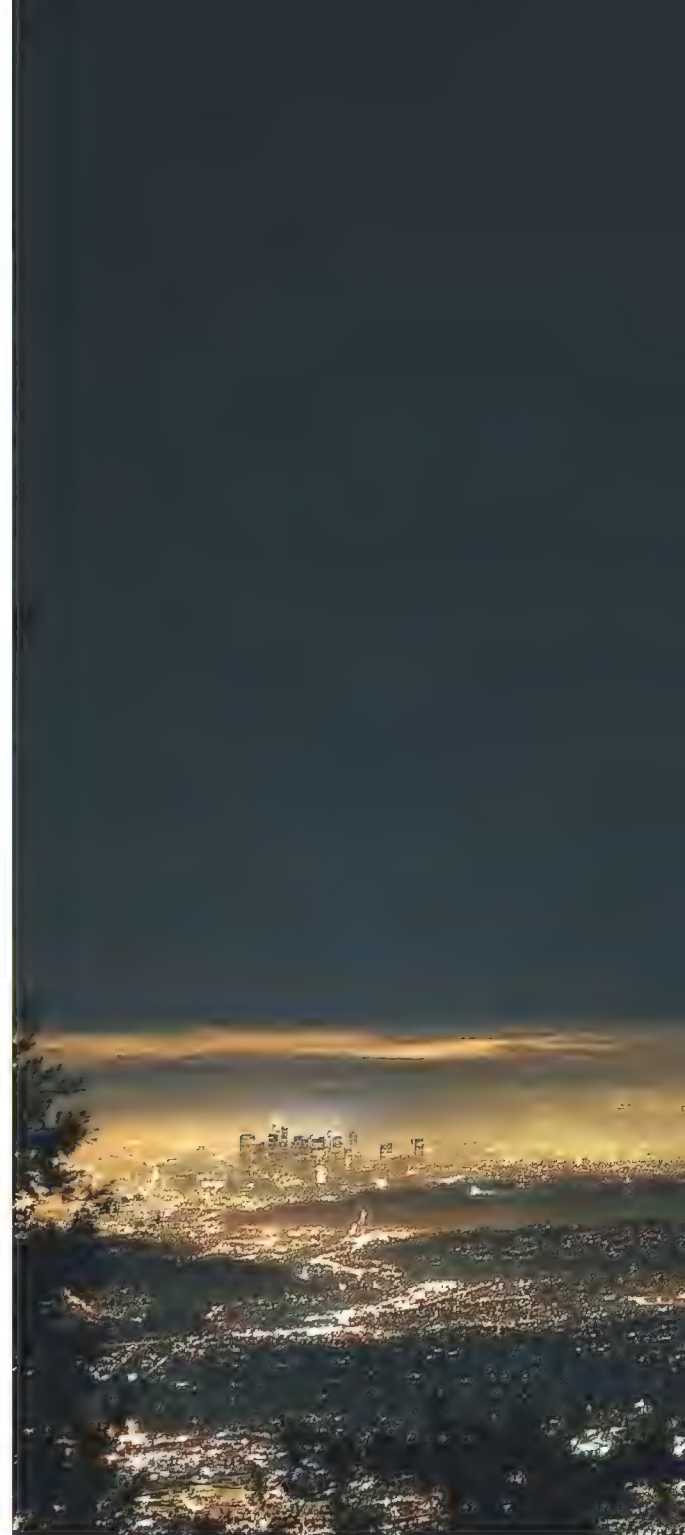
This and other sightings were reportedly collected in a so-called Blue Folder (not to be confused with the Blue Book), which after the Soviet collapse in 1991 was entrusted to Pavel Popovich, a cosmonaut-turned-UFO-enthusiast. He, in turn, drip-fed files to a wider audience over the next dozen years. (Popovich died last September; it’s not clear what became of the collection of reports in his possession.)

Yuri Andropov did not live long enough for *glasnost* to compel him to share his thoughts on the Blue Folder’s contents. But his top deputy and successor at the KGB, Vladimir Kryuchkov, remained unimpressed. “The Party Central Committee

and Council of Ministers asked me more than once to confirm or deny rumors about unexplained events, especially UFOs and ‘abominable snow men,’” he told the Russian newspaper *Komsomolskaya Pravda* in 2005. “The conclusion was always fruits of the imagination. Fear has big eyes.”

State-sponsored UFO studies peaked worldwide in the 1970s and 1980s, as the Soviet occupation of Afghanistan and the Reagan Revolution ratcheted up East-West tensions, and *Close Encounters* and *Star Wars* stirred the global imagination. Latin America showed particular enthusiasm.

On May 19, 1986, Brazil had its Night of the UFOs, with five fighters scrambling to chase mystery lights across the country’s southwest for two and a half hours. The air force minister went on TV the next morning to order a full investigation. Declassified only last year, this Brazilian report found: “The phenomenon is solid and reflects intelligence by its capacity to follow and sustain distance from the observers, as well as to fly in formation.”







DAVID M. JURASEVICH/MT WILSON OBSERVATORY

In the peaceful 1990s, military services in the West found it increasingly hard to justify the reporting of mystery craft. By 1991, when Nick Pope came to the United Kingdom's UFO desk, resources had shrunk to about one half of one mid-level official's time, namely his.

After the 1993 serial sightings of "two Concorde joined together," popularly known in Britain as the Cosford Incident, Pope and his unnamed counterpart at DI55 began quietly lobbying for a fresh look at UFOs. He got his wish for an MoD review of the files that had piled up over the decades, but the results disappointed him.

The study, circulated in 2000, was titled the Condign Report. It started open-mindedly enough—"That [UFOs] exist is indisputable"—but then lowered the rationalist boom. The vast U.K. archives contained no evidence of "incursions by air objects of any intelligent (extraterrestrial or foreign) origin," nor any "artefacts of unknown or unexplained origin."


**Venus, labeled the Queen of UFOs because it's so often misidentified, hangs beneath a star-like Jupiter and above the recognizable moon in the sky over Los Angeles.**

Whatever was out there, in short, it looked like no threat to Her Majesty's security. MoD UFOlogists spent much of the following decade first fending off and then acceding to freedom-of-information requests, finally closing down altogether last December.

That left only the unassuming Yvan Blanc to carry on, as planet Earth's de facto arbiter of the mysteries mankind just cannot leave alone. The ex-satellite engineer does seem a bit dazed during an hour-long talk on a mild Toulouse winter afternoon, not by evidence of distant civilizations but by the abrupt change in his own life after a quiet career.

Long a cog on the intricate machinery of multi-year space projects, Blanc has become a reluctant minor celebrity in France. "You can't stay for long in this job because it is hard to be in the public eye and maintain neutrality," he says. An aerospace

team player, Blanc feels doomed to intellectual loneliness, despite a GEIPAN advisory board that ranges from generals to psychologists, and his 100 eager citizen-investigators. "The very small number of scientists interested in this field are laughed at by other scientists," he observes calmly. "And of course we are attacked by the UFO community."

Yet the unlikely Man in Black is plainly having fun too. He betrays the slightest hint of swagger referring to the "professional investigation techniques" he deploys on witnesses, and obvious pride when he ends the interview with a tour of the case illustrations on his wall. Outside CNES' gates it seems like an ordinary afternoon in an ordinary city, with ordinary explanations for any object that might happen to fly overhead. But you never know for sure. At least that's what Yvan Blanc says. 



# CHECKING IN ON THE MISSING PERSONS FILE



## Amelia Earhart

**AMERICA'S MOST FAMOUS WOMAN PILOT** vanished on July 2, 1937, with navigator Fred Noonan, en route to Howland Island in the Pacific Ocean during an around-the-world flight in a Lockheed Electra 10E. Want the details? See *Amelia Earhart* by Doris Rich, *Amelia Earhart: The Mystery Solved* by Elgen and Marie Long, *East to the Dawn: The Life of Amelia Earhart* by Susan Butler, or some of the other 50 books about or by Earhart; the 2009 movie starring Hilary Swank, the 1994 one with Diane Keaton, or the 1943 Rosalind Russell version. But in a nutshell: She's still missing.

 PATRICIA TRENNER

**Earhart's goal:**  
Circle the globe at  
the equator.




**A mechanic examines the White Bird's engine compartment (top); Nungesser and Coli suit up for the transatlantic flight.**

## Charles Nungesser and François Coli

**WHEN THIS MAGAZINE** last left our heroes—the two French pilots who got lost crossing the Atlantic in an attempt to win the \$10,000 prize that Charles Lindbergh bagged 12 days later—their remains and their airplane were being sought in Maine's inhospitable backcountry. That was in February 1987, when *Air & Space* sent a reporter along on a search for the aircraft, *L'Oiseau Blanc*—the White Bird.

Charles Nungesser and François Coli had left Paris for New York on the night of May 8, 1927. A woodsman near the Maine town of Machias reported hearing an airplane above the clouds on the afternoon of May 9, and his story circulated among the locals for years. Searches of the area in the 1980s turned up nothing, but launched The International Group for Historic Aircraft Recovery (which later earned fame for claiming it had found a piece of Amelia Earhart's shoe). Twenty expeditions and 23 years later, TIGHAR founder Ric Gillespie, citing testimony reported in a 1927 *New York Times* article, has moved his search from Maine to New-

foundland. The *Times* noted that New Yorkers were "scanning the dripping skies and devouring eagerly false reports of [the aircraft's] appearances along the Newfoundland and New England coasts." Gillespie believes some of the reports weren't false. "Several people along the [Newfoundland] coast went to the magistrate and swore what they saw on the morning of May 9 in affidavits," he says. "The reports are 20 to 30 miles apart, and they line right up." On Newfoundland's Avalon Peninsula, residents have told of an airplane crashing in one of the area's many lakes. Gillespie has traveled several times to an area, dotted with ponds, that he could reach only by helicopter. On his next trip he hopes to search with LIDAR—light detection and ranging technology. He says, "I would rather find the White Bird than Amelia Earhart."

 LINDA SHINER



## D.B. Cooper

**ON THE EVENING** of November 24, 1971, a 40-something man paid cash for a one-way ticket from Portland, Oregon, to Seattle, Washington, aboard Northwest Orient Airlines Flight 305, a Boeing 727. He told the ticket agent his name was Dan Cooper.

During the flight, Cooper told a flight attendant he had a bomb in his briefcase, which he would detonate if \$200,000 in cash and four parachutes weren't waiting at the Seattle airport. They were. After landing, Cooper allowed all passengers to be released. He told the flight crew to fly to Mexico City. Somewhere over southwestern Washington, Cooper jumped from the rear exit into below-freezing temperatures and a driving rain. He had left behind a J.C. Penney tie, a tie clip, and two parachutes.

In the following days, the Federal Bureau of Investigation had interviewed a D.B. Cooper, according to a Portland, Oregon wire service reporter, and though the man was eventually cleared, the Northwest hijacker was forever after known by that name. The question of what happened to Cooper and his bag of loot has

become one of the FBI's best-known unsolved cases.

In 1980, eight-year-old Brian Ingram found a bundle of tattered \$20 bills totalling \$5,800 buried along the banks of Washington's Columbia River. The serial numbers identified the bills as part of the money Cooper had demanded.

In 2007, the FBI released new information, including a photograph of Cooper's black tie, from which a DNA sample was obtained. Last year, an FBI agent unveiled a possible profile of Cooper as a loner who might have worked as a cargo loader in the U.S. Air Force (hence the familiarity with parachutes) before taking, and later losing, a job in the civil aviation industry. After 39 years, the FBI is still searching.

DIANE TEDESCHI



The FBI circulated this sketch of missing hijacker D.B. Cooper in 1971. In 1980, tattered bills from the cash Cooper demanded (top) surfaced on the shore of the Columbia River.



A bracelet that may have belonged to Saint-Exupéry's wife, Consuelo (some say it was too small for St.-Ex), was retrieved, but no human remains were ever found.

the parts were indeed from Saint-Exupéry's aircraft. But what had brought it down? Enemy fire? Though the fragments retrieved from the sea had no bullet holes, there were too few pieces to rule out a hit. German pilot Horst Rippert believes he likely shot down the F-5B, but his claim has not been verified. Was it suicide? Or simply an accident caused by the sometimes careless Saint-Exupéry?

PATRICIA TRENNER

## Antoine de Saint-Exupéry

**IN 1998, A BRACELET** bearing the name Antoine de Saint-Exupéry, along with the name of his wife, Consuelo, was fished out of the Mediterranean Sea. The French aviator and author had disappeared on July 31, 1944, while flying an F-5B, a reconnaissance version of a Lockheed P-38 Lightning. Two years after the bracelet was recovered, a diver located parts from an F-5B off Marseille. In April 2004, French authorities announced that



# THE CURSE OF THE CARGOMASTER

*Readied to transport the first U.S. ICBMs, the Douglas C-133 had a peculiar habit.*

*It kept crashing.*



**THEY'D FLY IT AGAIN, IF THEY HAD THE CHANCE.** Among the group gathered at Delaware's Dover Air Force Base, there's a man for every crew station at the ready. They flew, maintained, navigated, and sometimes cursed one of the least understood aircraft in the history of the U.S. Air Force, the Douglas C-133 Cargomaster. In a conference room at Dover's Air Mobility Command Museum, papers are shuffled—Where was that article from the base *by John Sotham* | *Photographs by Mark Duehmig* news? Smudgy documents, their margins trailing off the page from copy-of-a-copy-of-a-copy Xeroxing, are offered. A small stack of VHS tapes forms a centerpiece. The men, some slowed by age and ailment, chatter and argue. A clamor of "There I was" stories fills the room, accompanied by hand flying. Then, with quiet authority, Hank Baker, a retired C-133 flight engineer, holds his hand up, as if to take an oath.

"Let me tell the story, please," Baker says, silencing the room. The men defer. Baker describes his dogged negotiations to bring the C-133B from display at the former Strategic Air Command museum in Offutt, Nebraska, to the ramp outside, an effort that has made him a C-133 honcho at Dover. After his introduction, jackets are gathered; pants hitched up. We stroll outside in the chill rain to walk around the last Cargomaster to leave the production line. I can see why the crewmen are proud of it: the majestic tail, impressive expanse of wing, elegantly streamlined engines, and thin, rapier props. This is a serious lifter of missiles, trucks, tanks—anything, really. But when we come to the nose, the face is a surprise: a clown visage with a ridiculous radome.

"In the early days of moving large cargo, we had to learn a lot of it as we did it," says Baker. "And, we didn't know a lot about what things weighed...especially when they saw that you could move other things besides a missile."

The C-133 was developed by the Douglas Aircraft Company at a time when the Air Force was in a hurry to deploy intercontinental ballistic missiles to bases around the country. The big turboprop, which first flew in

1956, had a cargo bay big enough to carry an Atlas or Titan ICBM, but to make loading them easier, Douglas modified the original design with clamshell doors to increase the size of the opening in the aft fuselage.

Dover's Cargomaster is parked next to its older, smaller cousin, the Douglas C-124 Globemaster. Many C-133 aircrew transitioned from the lumbering and unpressurized C-124, called Old Shaky by its crews and dragged aloft by four brutish Pratt & Whitney R-4360 engines—each a deafening whirl of connecting rods, pushrods, and 28 pistons the size of coffee cans.

"I had thousands of hours in the C-124—flying through weather at 10,000 feet," says Harry Heist, a retired navigator and Dover volunteer. "When I transitioned to the C-133—pressurized, fly-

**In the 86-foot-long cargo bay (opposite), former crewmen recall the hardware a C-133 could lift. Properly configured, five UH-1 Hueys could hitch a ride – in the 1960s, from Texas (right) all the way to Vietnam.**







176TH WING ALASKA AIR NATIONAL GUARD/LT. JOHN CALLAHAN

**The last airworthy C-133 squats at an Anchorage, Alaska airport, where from 1978 to 2008 it earned its keep delivering bulldozers, schoolbuses, and other equipment to remote areas.**

ing above the clouds—I felt like I had been born again.”

Baker and Sandy Sandstrom, a former flight engineer, fire up a diesel-engine external hydraulic power unit, and Sandstrom boards the crew ladder and disappears into the fuselage. Soon there’s a loud pop, and the rear clamshell doors slowly begin to part. They reach the end of their travel and stop with a shudder. We climb the aft ramp into the bay, and Baker recalls that often during fuel stops, a random piece of equipment—a truck, maybe an artillery piece—would appear at the back of the aircraft. Could it fly? “Our motto was, ‘Anything that’ll fit in the hole,’” says Baker.

After a tour of the cargo hold and cockpit, we climb down the forward boarding ladder. Baker squats next to where the Cargomaster’s nosewheel strut pokes out of the fuselage. In a loaded airplane, the more weight above the strut, the less of the smooth, machined inner cylinder would be visible, he says. “We’d look at the nose strut—the usual deflection was a pack of cigarettes. If it was less, the load was too far forward. If it was more, it was too far to the rear.”

Sandstrom shuts down the ground unit, and the pitch of the big diesel engine spirals down. The shouting stops, and as the men resume talking, the discussion turns to what the crews who flew and maintained the big airlifter inevitably end up talking about.

The crashes.

It was another cool Dover morning, April 13, 1958, when a four-man crew from the 39th Air Transportation Squadron rode the flightline van to C-133A tail number 40146. At 8:28 a.m., 40146 lifted off the runway behind what is today the museum hangar. The crew transmitted routine messages at 8:34 and 8:40. Three minutes later and 26 miles south of the base, the airplane fell inverted from the sky into Ellendale State Forest.

The Air Force grounded the C-133 fleet. It had been only 24 months since the first flight at the Douglas facility in Long Beach, California. Acquired under a new system of concurrent devel-



USAF/BENN WITTMANN VIA CAL TAYLOR

**The sixth Cargomaster crash, in 1964, killed seven crewmen and left wreckage near Goose Air Base, Labrador. Probable cause: Wing icing that led to a stall.**



opment and production, an Air Force attempt to limit procurement costs and delays, the C-133 program had no prototype phase; the aircraft had gone from drawing board to production line. Although the first eight airframes underwent flight tests at Edwards Air Force Base in California, most of the testing coincided with aircraft deliveries to operational units. Modifications were made throughout the Cargomaster's service life.

A team of accident investigators assembled at Dover. Most of their theories centered on a nastiness the Cargomaster had exhibited during its earliest tests: The aircraft gave its pilots virtually no warning when it stalled. The buffet that accompanies a stall, which in most aircraft serves as advance notice, arrived in the Cargomaster almost simultaneously with the stall itself. Tests also showed that abnormal airflow over the horizontal stabilizers could render the elevators ineffective. In early 1957, a fix was incorporated into the eighth aircraft built and retrofitted on the previous seven: a horizontal "beaver tail" that extended behind the vertical stabilizer helped to keep the airflow over the control surfaces smooth and to counter the airplane's tendency in a descent to tuck under. But 40146 already had those modifications. Why did it crash? Although the investigators couldn't report a definitive cause, they identified 17 deficiencies in the C-133's control system that could have been contributing factors, and a team of Douglas engineers traveled to Dover to correct them. A month later, the airplane resumed operation, and all was well—for three years.

The next two Cargomasters to go down simply disappeared during overwater passages. The first, an aircraft headed for Midway Island, and then home to California's Travis Air Force Base, left Tachikawa Air Base in Japan one minute before midnight on June 9, 1961. Twelve minutes after a normal takeoff, followed by a routine radio call, it was gone. Less than a year later, on May 27, 1962, number 71611 departed Dover, then dropped from

the radar shortly after the pilot reported passing through 13,000 feet. In the two accidents, 14 crew members died.

The C-133 began to get a reputation, and crews listened intently for any signal of a stall, especially during climbout when the aircraft, full of fuel, was heaviest. Sandstrom and other Cargomaster crewmen found that the airplane had a subtle stall warning device: the windshield wipers. "When we'd enter a stall, the windshield wiper would vibrate," Sandstrom says. "If you saw that, you better be putting the nose down."

But what if, on the next mission, you missed the Cargomaster's whisperings? What would it feel like to be pinned against the straps, watching helplessly as the ocean filled the wind-screen?

After a departure from Chateauroux Air Base, France, pilot John Burnett was settling in for a long flight. "I was making my radio calls and noticed the airplane shudder a little bit," he says. "The pilot in the left seat was moving the controls and nothing was happening. I yelled out that I was going for 15 degrees of flaps—we regained control of the airplane, dumped fuel, and returned to Chateauroux."

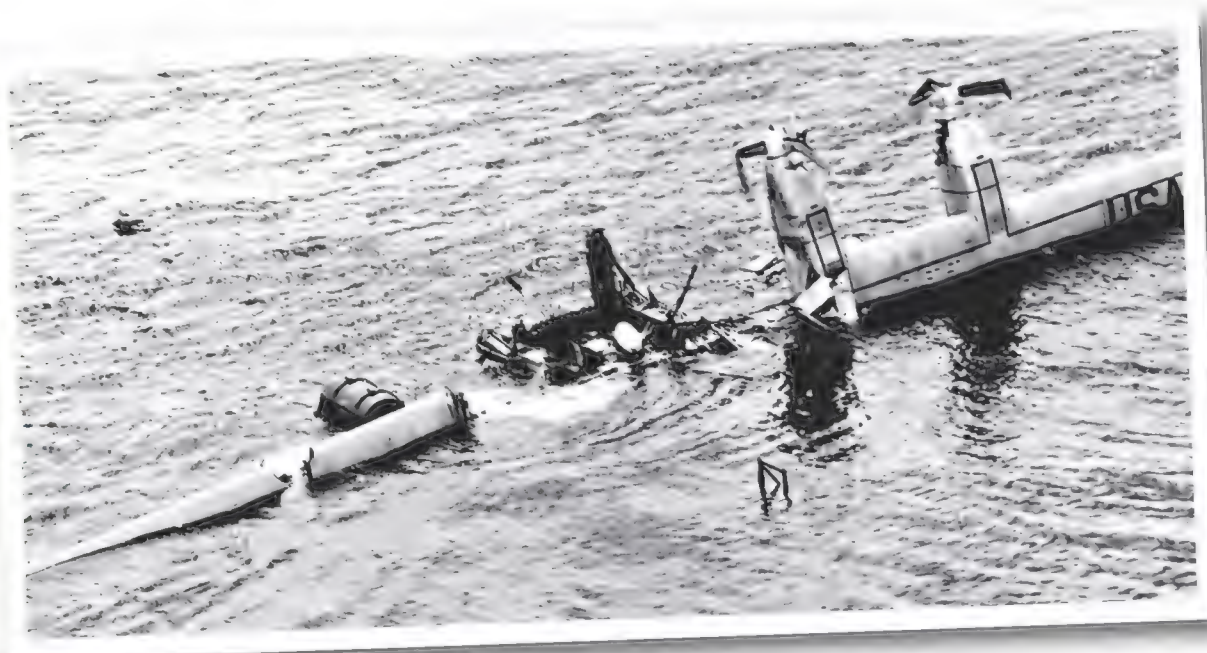
Instead of a stall, Burnett believes the elevators were partially blanked out—much as the earliest Edwards tests had demonstrated was possible. In fact, both cockpit airspeed indicators showed that the aircraft was operating well above stall speeds. "If you put the tail down into the turbulent flow from the wing, you lose elevator control," says Burnett, who was a C-133 flight instructor and examiner. What would happen to a less experienced pilot—perhaps with only seconds to react?

On April 10, 1963, the remains of another C-133 could be seen scattered across a field outside Travis. The mission had been a training sortie for two young lieutenant pilots. An experienced examiner pilot was in the right seat. One of the crew made a radio call acknowledging a runway change, the aircraft entered a

.....  
**BUT WHAT IF, on the next mission, you missed the Cargomaster's whisperings? What would it feel like to be watching helplessly as the ocean filled the windscreen?**



RIGHT: USAF VIA CAL TAYLOR



**Former C-133 navigator Harry Heist (left) considers a collection of Cargomaster papers, which include the puzzling accounts of nine crashes. The eighth aircraft to fall broke in half when the pilot ditched in the East China Sea (above), but the crew survived.**



steep turn, and then they were gone. Five months later, another C-133 departing from Dover disappeared over the Atlantic.

"It was the talk of the airlift career field," says retired lieutenant colonel Herbert Nakagawa, who was a navigator trainee in 1965 and accumulated 4,500 hours in the C-133. "I got that assignment [to the C-133] in nav school. One of my instructors came up to me and said 'It's been nice knowing you.' And, he was serious."

Delivering outsized cargo all over the world, Cargomaster crews were flying thousands of uneventful hours. Still, the drumbeat of accidents continued. "There was sort of a mystique around the aircraft," says Nakagawa. "It had a reputation as mysterious, since a lot of them just disappeared."

If you were headed home on leave and waiting in a passenger terminal to fly space-available, would you take the seat on the Cargomaster running up outside, or wait for whatever came along next? "There were a lot of people who were really scared to fly in it," says Nakagawa. "And there were people who [did] even though they were apprehensive." But Cargomaster crews, says Nakagawa, "wanted to make it work. They were dedicated to it."

"I was never scared of it," says Burnett, who instructed many of the crews at Dover. "It seemed to me that the more we could learn about it, the better we'd be. But I respected it."

In 1963, a full-scale investigation of the Cargomaster, the first of many, was convened at the Warner Robins Air Materiel Area in Georgia to help Military Air Transport Services study the five C-133 crashes. "They convened everybody," says Cal Taylor, a former Cargomaster navigator and perhaps the airplane's most knowledgeable historian. "The airplane builder, MATS... [they got] everybody involved to figure out what was going on."

"We had some of the best minds in aeronautics working on the problems of the C-133," says Sandstrom. "I took an airplane down to Warner Robins and while it was down there, they tore it completely apart. They put it all back together, and I was sent down there to preflight it. It flew just like it did when we flew it

**Left to right: 18-foot props on the -133's four engines moved a lot of air. The B model's clamshell doors offered greater clearance for oversize cargo. Sandy Sandstrom cranks open the side door.**



down there. They didn't figure out anything."

Roy Isaacs was a young structures engineer at Douglas when the first C-133 rolled off the line in 1956. He remembers one Air Force requirement stating that the airplane, when fully loaded, would be able to clear a 50-foot obstacle at the end of a 10,000-foot runway. "We had to redesign all the sections of the airplane three times," Isaacs recalls, "and we had to lighten [the airframe] and get the weight down to accommodate the engines. Consequently, it made the airplane have a bunch of problems. That engine is the downfall of the C-133."

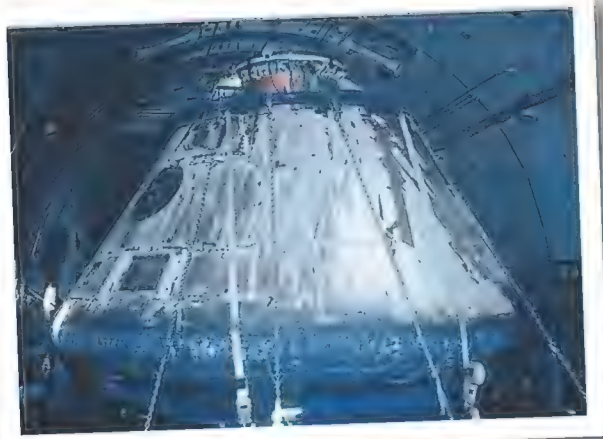
That engine was the Pratt & Whitney T34, the only turboprop available at the time that could get an airplane as heavy as a ful-







LEFT: NASM (SI-95 8693); TOP: DUANE MEIER VIA CAL TAYLOR; RIGHT: TERRY WALL



ly loaded Cargomaster off the ground. During cruise, the engines ran at a constant speed. To vary the thrust, a governor inside the propeller's nose case (located aft of the propeller blades) changed the blade pitch. When the pilot pushed the throttles forward to increase power, the governor angled the propeller blades to take a bigger bite of air. The mechanism in the nose case was in turn governed by a complex, electrically controlled system that synchronized blade pitch among the four engines.

"You could have a prop malfunction, and a number of things could cause it," says Ken Kozlowski, a former C-133 crew chief who served as chief mechanic and flight engineer on a privately owned Cargomaster that flew until 2008. Through monastic devotion to understanding every system on the C-133 and by developing his own maintenance procedures, Kozlowski kept the civilian Cargomaster flying as a bush airplane—and slamming onto remote Alaska gravel runways—nearly 40 years after the Air Force let it go.

Minute changes in engine performance, coupled with changes in altitude, airflow, or synchronization, kept the nose case mechanism constantly working to maintain optimum blade angle. At higher altitudes, the props had to increase pitch to move the same amount of air; at lower altitudes, the pitch needed to be reduced. Thomas

**Cargomaster contemporaries: Boeing B-52s and Atlas missiles (above, right) shared cold war duties with -133s. Besides delivering Titan missiles to their silos, the big airlifters transported Apollo capsules (top) brought to shore by Navy ships.**

Kaye, who was an Air Force hydraulic mechanic stationed on Midway, remembers seeing Cargomasters arriving from Japan that had been four-engine transports on takeoff but had only three engines operating by the time they landed. Once, a C-133 showed up with only two engines. It had been able to stay aloft only because the flight engineer injected a water-alcohol mixture (a standard takeoff booster) when the airplane was threatening to head toward the waves.

"The nose case [governor] would go," says Kaye. "The pitch was constantly changing to keep the [propellers] phased, and it was constantly loading and unloading the gearing in the nose. What they did later on was put a little time-delay relay and slowed the pitch changes down, which relieved the excessive load on the nose cases."

Propeller-system failures, along with the still-worrisome stall characteristics, were key suspects in two more crashes. After the second accident, the Air Force again grounded all the Cargomasters. Between April and August 1965, additional C-133 flight testing was conducted at Edwards. With Douglas engineer Roy Isaacs aboard many of the flights, the dangerous stall characteristics were confirmed, and investigators focused on how to prevent the Cargomaster's now-infamous right-wing rolloff. Cameras trained on tufts installed on the wings clearly showed the right wing stalling before the left—in fact, the left wing usually didn't stall at all.

The way to keep the Cargomaster from rolling onto its right wing during a stall turned out to be depressingly simple. "What







176TH WING ALASKA AIR NATIONAL GUARD/LT. JOHN CALLAHAN (2)

and at Dover,” Cal Taylor says. By the late 1960s, the stall strip and better aircrew training improved the airplane’s survivability. But because the propeller control system was still prone to fail, and airframes began to fatigue—a problem that would persist until the aircraft was retired in 1971—two more Cargomasters crashed.

Herbert Nakagawa remembers what his aircraft was carrying on April 30, 1967, and it hardly seemed worth his life. “The cargo was basically garbage—old drop tanks, miscellaneous old junk,” he says. “We spent the night on Okinawa and the next day we were going to Midway.”

The weather was fine—scattered clouds. After takeoff and climb to 12,450 feet, the number four propeller began to malfunction. The pilots shut the engine down, feathered the prop, and turned back toward Okinawa’s Kadena Air Base. One of the flight engineers attempted a last-ditch fix. “Master Sergeant Ray Wetzel went behind the engineer’s panel to jiggle with the propeller control system,” says Nakagawa. All four



**A Lockheed C-130 overflies a Cargomaster being prepped for display. From the -130, the much bigger Douglas got its drive-on, drive-off ramp and – to increase room for cargo – its wing set above the fuselage and landing gear in outboard blister fairings.**

we ultimately came up with was a triangular piece of sheet metal that we put on the leading edge of the left wing between number-one and number-two engines,” says Isaacs. Called a stall strip, the modification disrupted airflow over the left wing and caused it to stall when the right wing did. The modification was made at Dover and Travis to all aircraft in the fleet. Test pilot “Skip” Johnson test flew every airframe to ensure the strips—which were first temporarily attached to the left wing—were in the correct position so that when the aircraft was stalled during a test, the left and right wings stalled simultaneously. As if to demonstrate that the Cargomaster would never reveal all its secrets, one Dover C-133 snapped into a violent left roll during a test flight after its stall strip was attached. Of the 42 C-133s left in the fleet, it became the only one to sport a stall strip on its right wing.

Senior MATS officers then took the sum total of knowledge about the Cargomaster’s tendencies on the road. “They had a mandatory briefing for all aircrews in the base theater at Travis



**Former flight engineer Hank Baker sits at his old station, with instruments for managing electrical, fuel, and deicing systems. From the navigator’s panel (top): a radar scope (left) and radio altimeter.**





**Of 50 Cargomasters built, one continued flying until August 30, 2008, when it arrived at California's Travis Air Museum (right).**

propellers received electrical power through a single circuit that also controlled the pitch regulator. The circuit sparked and failed, and the props were locked at an angle too high for lower altitudes. Wetzel ran to strap in to one of the airline-style seats in back—what some consider the most survivable area in a crash. “At 2,500 feet, all three [remaining] engines flamed out,” Nakagawa says. “Fortunately, we still had airspeed, and we still had control of the airplane. When we hit, I was amazed I had survived. The airplane broke in half right in front of the wings. We had vests on, and we gathered together by the floating nose wheels. The copilot had bought all these cheap Japanese golf balls and while we were bobbing there, all these golf balls came floating up around us.”

Once all nine crewmen had been rescued, they formed an exclusive club: the only airmen to survive a Cargomaster crash.

After Nakagawa's crash, one more Cargomaster fell. On February 6, 1970, a C-133B left Travis to deliver a Vietnam-scarred CH-47 Chinook to Harrisburg, Pennsylvania. After cruising at 21,000 feet and with clearance granted for a climb to 23,000, Cargomaster 90530 broke up in flight. The majority of the debris fell on a field outside Palisade, Nebraska.

Roy Isaacs flew to Nebraska to help with the investigation. One day, standing on the stage of the town's National Guard armory and looking at the wreckage that had been assembled there, he noticed something. “You could see all the jagged pieces, but here was a straight line by the side cargo door,” he says. Isaacs used a jeweler's loupe to examine the edge of a long split about a foot above the side cargo door. Clearly, the metal had fatigued and failed. The crack had blown out a section of fuselage, which entered the arc of the number-two propeller.

C-133 maintainers found fatigue a continuing challenge, especially because air coming off the near-supersonic tips of the propellers produced vibration. To prevent further airframe stress failures during the last 17 months of the Cargomaster's service, ground crews attached 16 “belly bands,” four-inch metal straps, around the exterior of the fuselage.

“The fact that we tried to compromise the airplane by reducing the skin gauges and the gauges of the longerons—we had an airplane that was too flexible,” Isaacs says today. “I feel the company would be rather cautious in admitting it then, but now, in retrospect, it's hard to come up with anything different. Unfortunately, the airplane's reputation suffered, but all in all, the airplane met the 10,000-hour service life requirement. They did a tremendous job for the Air Force.”

Was the Cargomaster dangerous? Ten had crashed, and 61 men had been killed. In 1964, the C-133's accident rate per 100,000 flying hours stood at 2.7, while the C-130's was 1.9. The overall Air Force rate was 7.7. The C-133 had supported operations around the globe, and was even trusted with transporting Apollo command modules after they returned from the moon.

The debut of Lockheed's C-5A Galaxy brought an unceremonious end to the C-133's service. “On the first of January, 1971, we

.....  
**AS IF TO DEMONSTRATE  
that the Cargomaster would  
never reveal all its secrets,  
one snapped into a violent  
left roll during a test flight.**



all walked across the street and into an empty building and we became the 9th Airlift Squadron,” says pilot Larry Phillips. “All the guys who walked across the street that day were -133 people.”

At Dover and Travis, both steeped in the heritage of airlift triumphs like the Berlin Airlift and the re-supply of Khe Sahn, the Cargomaster is a hero. “In general, the [C-133's] biggest contribution is its development of the pattern of the modern cargo airplane, with a high wing and rear ramp,” says James Stemm, a curator at the Pima Air & Space Museum in Arizona. “The Cargomaster was the first application to a long-range heavy-lift aircraft. It leads pretty directly to the Lockheed C-5 Galaxy and the Boeing C-17 Globemaster III.”

The last time a C-133 flew was in 2008, when Ken Kozlowski's Cargomaster, N199AB, traveled from Alaska to California to become part of the Travis Air Museum's collection. “We always knew we were operating an airplane with a bad reputation,” says Kozlowski. “But it always got us home. That airplane never hurt anybody.”

At Dover, Baker and his crew have pointed out unique features on the cockpit control panels and flight engineer's station, the cargo compartment's miles of wiring harnesses, air and hydraulic lines, and cables that pass through the fuselage ribs; the high wing; the squat landing gear.... The rain is still coming in waves. Baker and Sandstrom grimace against the cold and button up the C-133. Sandstrom stows the forward crew ladder and closes the access panel. Both men give the Cargomaster a backward glance, then head inside. —





**Europe's Rosetta spacecraft flew past Earth three times, but experienced the flyby effect only once. Nobody knows why.**

Other scientists have trotted out exotic explanations for the anomalies: changes in the speed of light, gravity waves longer than the universe, a hidden fifth dimension. Stephen Adler of the Institute for Advanced Study in Princeton, New Jersey, floated the idea of the probes colliding with webs of dark matter—shadow particles that barely interact with regular atoms. Adler concluded that dark matter could theoretically cause strange flybys, but only if it has properties much different than most physicists believe. He suspects the anomalies arise instead from subtle, overlooked forces in conventional physics; with so many spinning bodies flying around,

# THE FORCE IS WITH THEM

**WHAT CHANGES THE SPEED OF SPACECRAFT FLYING BY EARTH? BY SAM KEAN**

**GOOD SCIENCE IS BUILT** on consistency, great science on anomaly. Albert Einstein devised his theory of relativistic mechanics partly to explain a tiny but stubborn irregularity in the orbit of Mercury. And now, some equally subtle glitches in the trajectories of deep-space probes have some scientists hoping to overthrow Einstein.


In 1990, NASA's Galileo spacecraft swung toward Earth to use our gravity for a speed boost on its way to Jupiter. Problem was, it picked up more speed than relativity predicted. The unexpected increase amounted to just tenths of an inch per second, and could easily be corrected later in the flight. But it persisted. A second Galileo approach in 1992 produced another anomaly, except this time the spacecraft lost momentum. Three more times in the next decade, other probes swung past Earth and emerged with the "wrong" speed—which got some ambitious scientists thinking. "Sure, it's in the back of people's minds," says Frank Jor-

dan, "that there may be something incomplete about the Einstein business."

Jordan and his colleagues at NASA's Jet Propulsion Laboratory in Pasadena, California, have studied the flyby anomalies since 1990; the only consistency in the velocity change is that it happens abruptly. The team discovered in 2007 that a spacecraft approaching Earth at a shallow angle relative to the equator and departing at a steeper angle got a boost, while a probe that did the opposite experienced drag. The only spacecraft to approach and leave at symmetric angles, the Messenger mission to Mercury, showed no effect.

Just when a pattern seemed to emerge, two subsequent asymmetric flybys showed no anomaly. Those passes occurred tens of thousands of miles higher above Earth than earlier oddball flybys, which might be a contributing factor. But Jordan admits he and his colleagues have made no more progress in resolving the mystery.

the equations can get hairy. Nevertheless, he puts the odds of discovering new physics at one in three.

Skeptics think those odds are too generous. Slava Turyshev, a researcher with JPL's astrophysics and gravitation group, recently helped dismantle the unrelated but similar "Pioneer anomaly." Scientists first noticed that effect in the 1970s, when Pioneers 10 and 11 passed by the outer planets, then drifted out of the solar system. The sun's gravity still pulls on the probes, so they are slowing down, but more so than they were originally expected to. Turyshev and colleagues have explained some of the deceleration by taking into account (among other things) the warming effect of on-board power sources on the spacecraft structure. Turyshev plans to scrutinize the flyby data in the coming year, and he expects that similarly overlooked effects, thermal or otherwise, will emerge. "I will be the last to believe in new physics," he laughs. 



**IT IS A QUESTION** that has lingered for more than 40 years: How did the first man in space *really* die? Experts have struggled to explain how a pilot as proficient as Yuri Gagarin could have perished in an airplane crash. The official 1968 investigation was inconclusive. Over the years, theories and rumors about the crash have abounded: One is that the former cosmonaut was drunk; another, that he was sabotaged by a jealous Leonid Brezhnev, then the Soviet leader. Now a team of researchers believes it has the answer. They contend that Gagarin, having discovered that an air vent in the cockpit of his MiG-15UTI was open, descended much too quickly from an altitude of nearly 14,000 feet, lost consciousness, and crashed.

"Nobody knows what really happened except us," retired Soviet air force Colonel Igor Kuznetsov, 70, told me not long before his death last May. Kuznetsov, who died in a car crash in Moscow, took part in the original inquest. In 2000, both out of a sense of duty to solve the mystery and personal loyalty to Gagarin (the two met in 1960), he began reviewing the case.

Kuznetsov and five aviation specialists reconstructed the MiG's flight during the fatal March 27, 1968 training exercise,

**Cosmonaut Yuri Gagarin (right portrait, at Kremlin wall in 1968) took the mystery of his final flight to the grave.**

# WHAT MADE YURI FALL?

*Igor Kuznetsov reopened the Gagarin inquest to find out.*

which began at a military airport about 20 miles northeast of Moscow. Gagarin, who seven years earlier made the world's first orbit of Earth in a Vostok capsule, was retraining as a fighter pilot and was in the two-seat aircraft with his instructor, Vladimir Seryogin. When he noticed the open vent at 13,780 feet, said Kuznetsov, Gagarin followed the procedures specified in the Czech-built airplane's operations manual, which stated that this situation called for a descent to 6,500 feet. But Gagarin dove too fast. Both pilots blacked out and the MiG crashed in a forest, killing the men. The problem, Kuznetsov explained, was that at the time, no rate-of-descent limits existed; those rules (164 feet per second) came out in 1975. "It was not their fault," he told me. "They were

following the instructions to the letter."

Former fighter pilots reject the explanation, pointing out that when pilots lose consciousness, *by Andrew Osborn*

it's normally from high G-forces, such as those that could occur in a break turn during a dogfight, rather than from a rapid descent.

Earlier this year, Kuznetsov had pressed for a new official investigation to lay the matter to rest. Russian officials, though, have so far refused, most recently in 2007. (Only President Dmitry Medvedev or Prime Minister Vladimir Putin are authorized to order a review.) With Kuznetsov gone, his colleagues would have to press to reopen the case; several whom I met at Kuznetsov's memorial service pledged to do just that. —





# THE 727 THAT VANISHED

*A case pursued by the FBI, the CIA, the U.S. Departments of State and Homeland Security, CENTCOM, and the sister of Ben Padilla.*

**SEVEN YEARS AFTER HER BROTHER DISAPPEARED** from Quatro de Fevereiro International Airport in Angola, Benita Padilla-Kirkland is trying to persuade the FBI to re-open his case. She believes she has the “new information” agents told her they require. But she suspects that the agency already has more information than agents will admit to.

Kirkland’s brother, Ben Charles Padilla, a certified flight engineer, aircraft mechanic, and private pilot, disappeared while working in the Angolan capital, Luanda, for Florida-based Aerospace Sales and Leasing. On May 25, 2003, shortly before sunset, Padilla boarded the company’s Boeing 727-223, tail number N844AA. With him was a helper he had recently hired, John Mikel Mutantu, from the Republic of the Congo. The two had been working with Angolan mechanics to return the 727 to flight-ready status so they could reclaim it from a business deal gone bad, but neither could fly it. Mutantu was not a pilot, and Padilla had only a private pilot’s license. A 727 ordinarily requires three trained aircrew.

According to press reports, the aircraft began taxiing with no communication between the crew and the tower; maneuvering erratically, it entered a runway without clearance. With its lights off and its transponder not transmitting, 844AA took off to the southwest, and headed out over the Atlantic Ocean. The 727 and the two men have not been seen since.

Who was flying 844AA? Had something happened to make Padilla take that desperate chance? Or was someone waiting inside the airplane? Leased to de-

liver diesel fuel to diamond mines, the 727 carried 10 500-gallon fuel tanks and a few passenger seats in its cabin. Less than two years after the 9/11 terrorist attacks, the 727’s freakish departure triggered a frantic search by U.S. security organizations for what intelligence sources said could have been a flying bomb.

Retired U.S. Marine General Mastin Robeson, commander of U.S. forces in the Horn of Africa when 844AA went missing, says word of the 727 “came up through the intel-

ligence network.” According to Robeson, U.S. Central Command (CENTCOM) considered moving U.S. fighter aircraft to Djibouti on the Red Sea coast, where the Combined Joint Task Force shares a base with the French military. Robeson continues: “It was never [clear] whether it was stolen for insurance purposes...by the owners, or whether it was stolen with the intent to make it available to unsavory characters, or whether it was a deliberate concerted terrorist attempt. There was speculation of all three.”

Speculation that the theft of 844AA posed a terrorist threat ended, though it’s unclear why. Perhaps National Geospatial-Intelligence Agency technicians saw signs of a crash in satellite imagery—debris or

*by Tim Wright*



# SEEKING INFORMATION

**BEN CHARLES PADILLA**

LUANDA, ANGOLA

MAY 25, 2003



## DESCRIPTION

Age:	50 years old	Hair:	Brown
Sex:	Male	Eyes:	Brown
Height:	6'2"	Race:	White
Weight:	Unknown	Complexion:	Light

Padilla is a United States citizen from the state of Florida.

## THE DETAILS

On May 25, 2003, approximately 6 p.m. local time, an airplane took off from DeFeverreiro International Airport in Luanda, Angola, with neither clearance nor a flight plan, and has not been seen since. The plane is described as a 200 series advanced 727 jet with a tail number of N844AA, and a serial number of 20985. The plane is painted silver in color with a stripe of blue, white, and blue. The plane was formerly in the air for airline, but all of the passenger seats have been removed. It is outfitted to carry diesel fuel.



Deal maker Keith Irwin (at left) and a crewman (obscured for anonymity) in the 727, fitted with fuel tanks to supply Angola's diamond mines. Did Ben Padilla steal the airplane?



an oil slick in the Atlantic, for example—or evidence that a large aircraft had landed on one of a half-dozen unpaved, 8,000-foot runways in the Congo, north of Angola. Agency spokesperson Susan Meisner would not comment, saying that the NGIA was not the lead agency in the case. (A CIA spokesperson also declined comment, as did a spokesperson from the Department of Homeland Security. FBI agents also refused comment, citing national security concerns.) Perhaps the speculation ended more gradually, after weeks without clues or sightings stretched into months. The disturbed hornet’s nest of a global security alert—the searches, bulletins, and interrogations—quieted, and in 2005, the FBI closed its case. I have filed Freedom of Information Act requests with the CIA

through. Irwin ended up with fuel tanks and no airplane.

That failure stranded six crewmen who had assembled in Miami. “The guys then were desperate for work,” says Irwin. “Most of those guys had not flown in a long time because of the 9/11 story. I said, ‘Look, I can take you on if we can find another aircraft.’” And Irwin met Maury Joseph, president of Aerospace Sales and Leasing, Inc. Joseph owned three 727s that had recently been retired by American Airlines. “All three aircraft were almost in mint condition,” says Irwin. “American Airlines had a very good maintenance program.”

New deal: Joseph sold 844AA to Irwin for \$1 million and change. According to his records, he received a down payment of \$125,000, and says he stipulated that

not worked in Angola before, realized immediately that the deal was in trouble. The company hiring his partners for deliveries, Kuwachi Dundo, was supposed to pay \$220,000 when the airplane and crew landed, but instead the company’s representative made excuses. (Irwin lost almost \$140,000 in the first deal and had burned through the rest of the \$450,000 by March.)

The crew endured accommodations in a dismal apartment without electricity or drinkable water, near an open sewer. (Gabriel and Irwin didn’t stay with the crew; they had rented an apartment in the back of a house owned by an Angolan air force general.) The only one of the men not troubled by the circumstances they found in Angola was Mike Gabriel. Gabriel, a dealer in aircraft parts and engines, had spent a considerable amount of time in West Africa, and was accustomed to the AK-47s the men saw everywhere, including stacked up behind the bar of a club they frequented. Most worrisome to the crew was that they were required to surrender their passports on arrival. Irwin explains that Kuwachi needed the passports to obtain Angolan licenses for the pilots and flight engineers.

“I was scared to death. I really thought I was going to die,” says Art Powell, one of the flight engineers with the project. Powell had been to Angola before and had spent a year working in Nairobi, Kenya, but this experience was different. He felt intimidated by the people who had hired the crew for the fuel-delivery job. His anxiety was intensified by the presence of a local “helper” who toted an AK-47. The helper was a guard whom Mike Gabriel says he hired because the crew repeatedly voiced concerns about safety.

When Kuwachi got wind of the crews’ unrest (several crew members have admitted that they were planning to steal the aircraft to escape to South Africa or return to the States), the company refused to return the passports. Irwin and members of the crew went to the U.S. Embassy; only then were the passports returned.

By Angolan regulations, Irwin says, 844AA was controlled by the clients who hired it. Prohibited from flying the aircraft out of the country, Irwin booked airline seats and flew the crew members to South Africa. From there, two of the men immediately flew home to the United States. One says he is still owed \$17,000. The other four

.....

## A U.S. Air Force veteran, the crewman likened the deliveries to flying into a combat zone. When they approached the airfields, the pilots tried to stay at an altitude above small-arms fire for as long as possible, then spiraled down to land.

and FBI and have followed in at least some of the FBI’s footsteps, interviewing the people who flew 844AA to Angola and worked with it there, hoping to understand how a 727 could just disappear.

**“IT REALLY WAS** in beautiful condition,” Keith Irwin says of the airliner he acquired in Miami in February 2002. Irwin, 57, a South African entrepreneur who ran a series of information technology companies and, until 2000, a small tourist airline with flights from South Africa to Mozambique, had come to Miami to pick up a different aircraft altogether. Representing a joint venture with a South African company called Cargo Air Transport Systems, Irwin had arranged to lease a 727 and two flight crews—pilot, first officer, and flight engineer—for a year. The air transport company had signed a contract to supply fuel to diamond mines in Angola, where a long civil war had made transporting goods by road almost impossible. The 727, therefore, was to have been delivered with fuel tanks installed in the cabin. The joint venture was backed by a single investor, who had deposited \$450,000 in a U.S. bank. Irwin’s job was to manage the flight operations, but the deal for the airplane fell

the balance be paid within 30 days. He agreed to remove the passenger seats from the cabin and to allow Irwin to take the airliner to Africa. Irwin says he cannot remember the details of the agreement, but recalled it to be a lease arrangement. In any case, the joint venture made only two payments and defaulted.

Though the two men now differ over the terms of the contract, they agree on one detail: As a condition of the agreement, Irwin was required to take along one of Joseph’s employees, Mike Gabriel, whose job was to make sure that the deal was concluded. “I gave Mike \$10,000 and told him to fly with them,” says Joseph. “Stay with the plane till you get the money, and then come on home, and if not, bring the plane home.”

On February 28, 2002, with most of the passenger seats removed and the 10 fuel tanks loaded, 844AA, still in the livery of American Airlines, with a blue stripe down the side and an AA logo fading on its tail, took off for Africa.

Because Irwin’s partners had not arranged a landing permit, it took two weeks for the crew to make their way to Quatro de Fevereiro International Airport, where they arrived on March 14. Irwin, who had





**Clockwise from top left: With the right main gear stuck in dirt, workers from an Angolan mining town help to shift fuel to the left wing and dig the airplane out; a Congolese visa; Mike Gabriel with the Angolan air force general who rented him a room; 844AA on a clay strip near one of the diamond mines.**

land uphill, then go downhill, then uphill again," he says.

At one airstrip, the anonymous crewman says, just before 844AA arrived, a 727 flying for a competing company crashed on landing and skidded off the runway. Although the crew survived, he says, some local residents were killed. "We gave [the other flight crew] a lift out of there but not before going over to their airplane and stealing some parts that we needed. That's when I decided it was time to go home."

Before he left, he says, a "big African showed up with a briefcase full of hundred-dollar bills. It was payday." Besides paying the crew, the money was supposed to pay off accumulated airport fees and fuel costs.

"After that," the crewman says, "I created a family emergency.... I said, 'My mother is sick.' " He promised he'd return in two weeks and left. "I had no intentions of going back, of course. I didn't get anywhere near full pay, but I got enough that I could pay my bills and make it not completely worthless."

By the end of April, all of the Americans except Mike Gabriel had left.

Irwin hired a local crew and continued to deliver fuel to the mines, but he was ready to leave too. The civil war in Angola had ended. Competition among fuel haulers, Irwin says, had intensified, and he was growing more uncomfortable with the delivery deals. His partners were claiming part ownership of the aircraft, but Maury Joseph had not been paid. Joseph, meanwhile, sent a crew to swap an engine from the 727. Finally, Irwin says, he was being followed—by a local man named Antonio, who, Irwin believes, was working for one of his partners. "I would turn around," Irwin says, "and spot Antonio watching me from a car."

Irwin began wedging a chair under the door handle of his hotel room "just like you see in the movies." One night, he heard a key card slide into the slot on the door.

crewmen, still hoping for the money they'd been promised, stayed on.

By April, Irwin was extricating himself from the deal made by Cargo Air Transport Systems and had found a new backer, an Angolan who arranged deliveries for a different client. Irwin and the remaining crew returned to Luanda and began flying the shipments for the new company. Mike Gabriel placed the total number of flights made at 17.

"It's the most dangerous flying in the world," says a crewman who asked that his name be withheld because he fears for his career. A U.S. Air Force veteran, he likened the deliveries to flying into a com-

bat zone. When they approached the airfields, the crew tried to stay at an altitude above small-arms fire for as long as possible, then spiraled down to land.

"I've been a [flight deck crew member] for 30 years," he says. "For me, it was an opportunity to make a couple of bucks... and when everything started falling apart, I probably hung on twice as long as common sense dictated. But I had too much invested at that point to bail out."

Many of the runways, says Mike Gabriel, aren't paved and aren't like the ones U.S. crews are accustomed to. "On some, you



**Clockwise from top left: Ben Padilla's I.D. from a former job; 844AA in Miami; a restaurant in the Republic of the Congo, with Maury Joseph at far left, almost out of the photo; John Mutantu in Luanda; 844AA on a clay strip in northeastern Angola; one of the mining towns that needed diesel fuel for generators.**

The lock released. "I started yelling and whoever it was ran," he says. The hotel security guards questioned the night clerk and learned that he had accepted a bribe to provide the key card. Irwin left the country the next day and didn't go back.

Maury Joseph fired Mike Gabriel some time that spring. "He kept convincing me that next week, next month....," Joseph says, referring to the outstanding balance owed on the airplane.

In May 2002, the only part of the original 844AA project left at the Luanda airport was 844AA.

**THE SON OF A FLORIDA MILLWRIGHT,** Ben Charles Padilla Jr. was always mechanically gifted, says sister Benita Padilla-Kirkland, and from the time he was a boy, he loved airplanes. In his mid-20s he learned to fly and became certified as an airframe-and-powerplant mechanic. He lived in south Florida with two children, one his own, and a fiancée of 15 years. (Efforts to contact her were unsuccessful.) Though the two weren't married, Padilla gave her power of attorney in his absence and made her the executor of his estate, according to Padilla-Kirkland, and left her almost everything in his will.

"He certainly knew the airplane," says Maury Joseph. Padilla was a freelancer, who had worked for Joseph on two jobs before traveling to Angola to repossess 844AA. Padilla had worked extensively in Africa. He helped Joseph ferry a 727 to Nigeria for a sale and during the negotiations stayed to explain the aircraft systems. "If you said, 'Go to Cambodia and do this' or 'Go to Indonesia and do this' or 'Go to South America and do this' he would do it. [When in Nigeria] I was with Ben daily for a month or more," says Joseph. "You become fairly close to somebody when you're with them day and night." Joseph trusted him.

But another employer formed a different opinion. Jeff Swain, who works near Miami in international aircraft sales and



leasing, had hired Padilla in the late 1990s for an airline he was operating in Indonesia—and fired him. "We had certain standards of conduct we expected from flight engineers," Swain says, adding, when pressed, "He was too involved in chasing the local girls. It was an unstructured environment, and he just went bad." Swain says that after Padilla was fired, he stayed on in Indonesia for two months and racked up a \$10,000 bill that he told the hotel the airline would pay. "We finally had him deported," says Swain.

Padilla once showed Swain a photograph of a woman with small children and told him it was his wife in Mozambique, but Swain says, "I never believed it was real. Ben was always marveling everyone with his bullshit stories." One of Padilla's friends also saw a photograph of a wife, but insists that she lived in Tanzania. Another acquaintance was told

that Padilla had a wife in Indonesia.

Benita Padilla-Kirkland says she's heard the stories, but believes her brother would have told her if he'd had another family. She doesn't doubt the relationships, but is convinced that Padilla was helping to support people he'd befriended. "There might have been more than one of those situations," she says.

**WHAT IN FEBRUARY 2002** had been a retired airliner in excellent condition had by fall become a junker worth only the price of its engines. And Maury Joseph found a buyer for them: Jeff Swain. Swain says that Irwin and the crews had ruined the airplane. "It would never be of any value again," he says. "You can't put water tanks full of fuel in an airplane and expect it to be good. Totally stupid. But it had really good engines on it—maybe 1,000 cycles since new."





TOP RIGHT: COURTESY KEITH IRWIN

Johannesburg, South Africa, where Joseph was waiting with his new customer. A day or two before the aircraft was to leave Luanda, Padilla made plans with Air Gemini to take the aircraft from the company hangar out to the main runway, where he intended to run the three engines up to full power for a systems check.

Late in the morning on May 26, when Joseph and Swain were expecting 844AA to land, Joseph took a call from an Air Gemini employee, who demanded to know why another crew had flown the airplane out of Luanda. "He was kind of hard on me," Joseph says. After the shock wore off, he telephoned the U.S. Embassy in South Africa to report the disappearance, then called his wife back in Florida to tell her to call the FBI. From Washington, D.C., the Department of State, notified by the U.S. Embassy in Angola, sent a message to every American embassy in Africa: Alert aviation officials that an airliner has been stolen, and call every airport with a runway long enough to handle a 727.

For the U.S. government, fraud was one

barred Joseph from acting as an officer in a publicly held company.

But Joseph, when contacted by the FBI, volunteered to take a lie-detector test, and Swain, who was there when Joseph took the call from Air Gemini, is certain that Joseph had nothing to do with the airplane's disappearance. "Look, nobody was more amazed by this situation than Maury," Swain says. He describes Joseph as utterly confused by the information that the airplane was gone.

The suspicion that Ben Padilla could have played any part in an insurance fraud angers his younger brother. "If anybody would say to me that my brother was involved with this," says Joe Padilla, his voice tightening, "they're full of it. 'Cuz I know my brother. He's not gonna do nothing crooked. I know that for a fact." He is convinced that more than one person was already on board, waiting, and that they forcibly took the aircraft, and killed Ben and John Mutantu.

"I keep hoping against hope that maybe he's tucked away somewhere," says Beni-

.....  
**From Washington, D.C., the Department of State, notified by the U.S. Embassy in Angola, sent a message to every American embassy in Africa: Alert aviation officials that an airliner has been stolen, and call every airport with a runway long enough to handle a 727.**

In November 2002, Joseph and Ben Padilla flew to Nigeria to deliver a 727, and Joseph hired Padilla to fly to Angola the following April to pay the outstanding fines and hire mechanics to return the 727 to service. "If [the company that contracted for fuel deliveries] wasn't paying Mr. Irwin, you can assume he wasn't paying anybody," says Joseph. "He probably hadn't paid the fuel bill. He didn't pay the navigation fees, the landing fees, and certainly wasn't paying the parking fees at the airport. So all of those became things that we had to resolve and I had to pay all those."

Padilla worked with Air Gemini, a Luanda-based airline that operated a repair station. The return-to-service process was progressing steadily, according to Joseph, and in May 2003, acting as Joseph's agent, Padilla hired a pilot and copilot from Air Gemini to help him deliver the aircraft to

theory that could explain the aircraft's disappearance. "Part of the intelligence was that the airplane was in a bad state of repair," says General Robeson. "That was one of the speculations, that it was an insurance fraud situation. You know, 'Oops, my plane was hijacked/stolen by terrorists and now I can do an insurance claim on it.' So, that was probably as valid of an explanation when all was said and done as anything. But we just left it as an unknown."

Among intelligence officials, the suspicions of fraud may have been aroused by knowledge of an incident in Maury Joseph's past. During the 1990s, Joseph was CEO of a cargo airline named Florida West (which later went bankrupt). The Securities and Exchange Commission charged him in a civil case with falsifying financial statements and defrauding investors. The court imposed a fine and

ta Padilla-Kirkland. The new information she passed along to the FBI was a possible sighting of the aircraft, one of many reported over the years.

Mike Gabriel believes the airplane crashed in the Atlantic Ocean soon after takeoff. One crew member from the fuel delivery operation thinks the Angolan air force shot it down with a missile. A Luandan pilot says the word there is that the aircraft went north and vanished near Kinshasa, Congo. One of Ben Padilla's friends says the airplane was disassembled for parts in Bujumbura, Burundi, on Tanzania's western border.

Picking through the fragments of 844AA's history, I found a story of broken deals, disappointments, and betrayals, but no real clues to the aircraft's destination that day in 2003. We may never know for sure where it went. It is the largest aircraft ever to have disappeared without a trace. —



# The Curious Case of EDGAR MIX

A CELEBRATED AERONAUT  
FINDS EARTH-BOUND LIFE  
DIFFICULT TO NAVIGATE.

BY REBECCA MAKSEL



The dapper Edgar Mix (1905 self-portrait, above) avidly documented aeronautical events around Paris, including a jaunt with two fashionable mesdames from the Aero Club (right).



LEFT: NASM (MIX-48-04); MIDDLE: NASM (MIX-66-20); RIGHT: NASM (MIX-77-09)





**FOR AVIATION ENTHUSIASTS** at the turn of the century, Paris was the place to be. In 1901, thousands thronged the Parc de Saint-Cloud on the city's outskirts to watch Alberto Santos-Dumont, competing for the Deutsch Prize, take off in his one-man powered airship to fly to the Eiffel Tower. The wealthy aeronaut, who won the city's heart by splitting his prize money between his mechanics and the city's 4,000 registered beggars, pronounced the seven-mile trip "remarkably intoxicating." But by 1906, when Paris hosted the first Gordon Bennett cup, an international distance race for balloonists, Santos-Dumont had moved on, and was creating a sensation with heavier-than-air

craft. The citizens of Paris were treated to two types of aerial spectacles: balloons and airships, which had entertained them for more than a century, and a new invention, which would dominate the century ahead: the airplane. Fortunately, one of the flight enthusiasts living in Paris at the time was Edgar Mix, an American engineer and amateur photographer. From Mix's photographs, historians now have a view of the transition in aircraft that occurred in Paris more than 100 years ago.

"Today, Mix is a very obscure character," says Melissa Keiser, chief photography archivist at the Smithsonian's National Air and Space Museum. "He learned how to fly balloons in Paris, and that's ap-

**In a Mix photo chronicling the 1907 St. Louis race, pilot Alfred Leblanc stands in the *Île de France's* gondola. Sleep in the small basket was impossible; fortifying themselves with canned meat and sandwiches, Mix and Leblanc stayed awake for 41 hours.**





LEFT: NASM (MIX-107-07); BELOW: NASM (MIX-59-16)

**Before serving as Leblanc's copilot in the Gordon Bennett International Balloon Race, Mix had made just 15 ascensions, one of them this May 1907 Aero Club outing over a Paris park.**

parently where he became interested in aviation. Ballooning became a passionate hobby for him.”

Mix became so fascinated by ballooning that he persuaded famed aeronaut Alfred Leblanc to accept him as copilot of the *Île de France* in the second annual Gordon Bennett International Balloon Race, set in St. Louis, Missouri, in October 1907.

“Mix was an avid photographer, and seems to have carried his camera everywhere,” says Keiser. “His photographs give us an intimate portrait of the life of a gentleman balloonist in the pre-World War I period, and—since he carried his camera aloft—include beautiful early aerial views of Paris and its environs.”

Mix was equally interested in documenting his new hobby, and took hundreds of photographs, some of which are in the Museum's collections. In 1998, a descendant gave the Museum nearly 700 stereographic glass plates from Mix's collection, most having to do with early aviation and ballooning.

Although a German team won the 1907 race, Leblanc and Mix placed a close second, landing in Hubertsville, New Jersey, after traveling some 875 miles, just five miles short of the German record. “Had we known that the *Pommern* was going to beat us [by] only a few miles we would have gone 50 miles out into the ocean to win the race,” Mix told the *Columbus* (Ohio)





*Citizen*. “We had plenty of ballast left.”

Mix’s interest in aviation grew. He served as a judge at the Reims Air Meet in August 1909, hobnobbing with such well-known aviators as Louis Blériot, Hubert Latham, Henri Farman, and Glenn Curtiss. By October that year, Mix decided to borrow a balloon and enter the 1909 Bennett race, held this time in Zurich, Switzerland. Piloting the *America II*, Mix traveled 696 miles to a forest north of what is now Warsaw, Poland. He won the race, but as he headed by train back to Paris, he received a telegram informing him that his win was being contested by a witness who claimed Mix’s balloon had touched down earlier in the race—grounds for disqualification.

Mix explained to race officials and reporters that near Prague, his balloon had been dragged to the ground. “The guide rope trailing beneath the basket struck the ground in a town or village,” Mix told the judges. “We could not make out the dimensions of the place, owing to the thick fog. Several persons caught hold of the rope, notwithstanding my protest, and, despite my endeavors to make them let go, dragged the balloon to earth. The basket touched the ground, and rested there probably between five and seven minutes, until I had been able to persuade the people to let go.” After much debate, the race organizers ruled that Mix could keep the trophy.

But the internationally renowned balloonist never competed again. And here the story takes a strange turn: Just two

years later, Mix allegedly penned a suicide note and jumped from a mail boat headed from Dover to Calais. His body was never found.

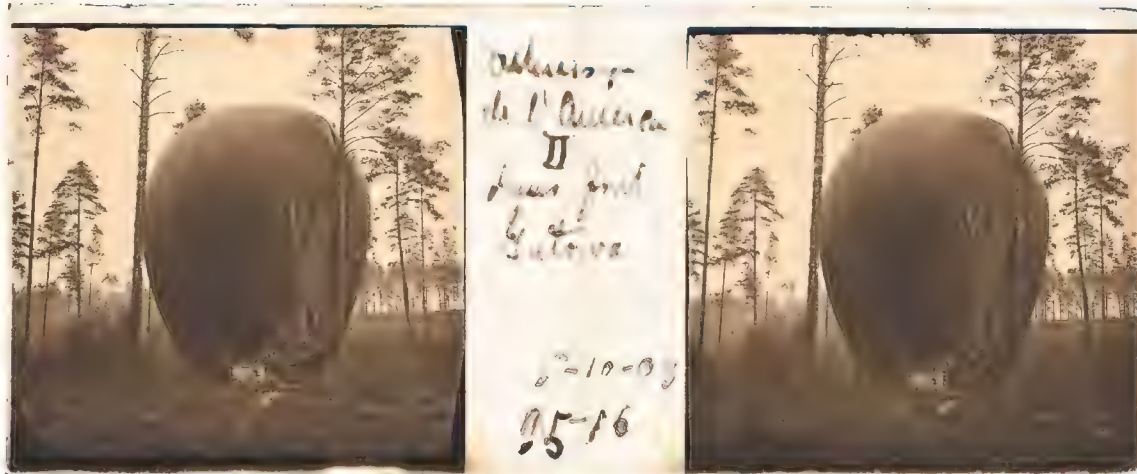
The balloonist’s two sisters, living in Massachusetts, were convinced their brother was murdered, and asked the U.S. State Department to investigate. “They said he was active, he was happy,” says Scott Caputo, an independent researcher based in Columbus, Ohio, who is writing a book about Mix. “They did say he had a lot of enemies—other

aeronauts. Were there bad feelings because of the decision in 1909 to award him the prize? I don’t think that the sisters’ cry for an investigation was ever given any serious consideration.”

We will never know the truth of Mix’s death. But the photographs he left behind record those brief years when balloons competed for the public’s attention with powered craft made of wood, cloth, and wire, and no one knew which kind of flight would eventually transform the world. ➤



As a photographer, Mix recorded everything from the 1906 Paris auto show, which he helped illuminate with electric light (left), to the 1909 Reims airshow, where he served as a judge (above, a Voisin takes a header), to his 1909 Bennett race win in the *America II* (he landed in a forest near what is now Warsaw, Poland).



LEFT: NASM (MIX-95-16); ABOVE: NASM (MIX-93-09)





# CAUSE UNKNOWN

*What brought down these five airplanes?*

LIKE THE ROYAL CANADIAN MOUNTED POLICE, who always get their man, aircraft accident investigators are expected to solve every case.

by *Lester A. Reingold* But Mounties don't nab every crook, and occasionally, an airplane crash can't be explained. Mystery compounds



**What doomed Pan Am Flight 103 as it flew over Lockerbie, Scotland, in 1988? Reconstructing the remains shows where a bomb tore through the 747's cargo hold. But some air catastrophes go unsolved.**

an accident's tragedy, leaving families to wonder about the fate of those they lost. And from the perspective of those in the airline industry, understanding the cause of an accident is the only way sufficient measures can be taken to prevent a recurrence.

The tools and techniques of accident investigation continue to advance. In the past, flight data recorders could capture only five aspects of aircraft performance; some current digital devices can record more than 1,000. With new software, investigators can also make better use of that data in documenting an aircraft's final moments. Not only has accident in-

vestigation grown more sophisticated, air travel has become safer. With these strides, unsolved—or partially unsolved—cases have become rarer. Still, one such rarity may be developing in the South Atlantic. As this article goes to press, the inquiry into the 2009 crash of Air France Flight 447 continues.

Investigators try to learn not only what happened in an accident but why. The “why” is usually the tougher question. In 1972, for example, as a British European Airways Hawker Siddeley Trident departed London's Heathrow Airport, the leading-edge slats were prematurely retracted, and the airliner fell to the ground. Did a medical emergency incapacitate the captain? There is evidence suggesting this, but no proof.

Sometimes an accident stumps investigators until similar subsequent disasters establish a pattern and point the way to solution and prevention. That was the case with the infamous 1954 de Havilland Comet crashes, which







Since Air France Flight 447 fell into the Atlantic on a flight from Brazil to France, search helicopters have recovered 50 bodies, but ships have been unable to locate the airliner's two recorders.

itary and their families, as well as Department of Defense employees, from McChord Air Force Base, near Tacoma, Washington, to Elmendorf Air Force Base, near Anchorage, Alaska.

During the first half of the trip, radio communications indicated an uneventful flight. About two and a half hours after departure, though, the pilots requested clearance to climb from 14,000 to 18,000 feet. Controllers told them there was traffic at the requested altitude. No one replied. In that interval, something catastrophic occurred, but what? The answer lies under more than 8,000 feet of water in the Gulf of Alaska.

The report on the crash of Flight 293 is a slim document. The investigation chronicled the seemingly innocuous prelude to the flight: Aircraft mechanical condition, crew qualifications, and the like all seemed to be in order. In the aftermath of the accident, a recovery operation yielded only about 1,500 pounds of wreckage. Investigators conducted as much analysis as they could—determining, for example, that there was no indication of an inflight fire or explosion. The degree of fragmentation suggested that the aircraft hit the water at high speed. And the deformed shape of the seat backs indicated that the fuselage came down nearly inverted. The pattern of floating wreckage showed that the airframe probably remained intact until impact. The report considered the possible reasons the pilots requested altitude change, such as to avoid icing or turbulence. In the end, the Civil Aeronautics Board concluded its inquiry without a finding of probable cause.

Seven and a half months before the accident, another Northwest Airlines DC-7C had ditched, this time in the water off Sitka, Alaska. All 102 on board survived. It was the same flight number, with the same origin and destination, as the aircraft that later crashed in June. The earlier aircraft had lost power in one engine, followed by uncontrollable propeller overspeeding.

stemmed from a flaw in the design of the airliner's windows. In other cases, solutions are found but disputed. National Transportation Safety Board (NTSB) investigators concluded that the 1999 loss of an EgyptAir Boeing 767 and the 1997 loss of a 737 from Indonesia's SilkAir were both caused by the pilots intentionally crashing the aircraft, but in each case, the airline's government does not accept the verdict.

In some cases, investigators may need decades to close the books. In 1947, a British Lancastrian airliner crashed high in the Andes Mountains. It took 53 years for a glacier that had encased part of the wreckage to melt sufficiently for investigators to find the remains and examine them for clues. A team organized by novelist Clive Cussler has been searching the bottom of Lake Michigan for a Northwest Airlines Douglas DC-4 lost in 1950.

Here are five of the most stubbornly unyielding mysteries in aircraft accident investigation.

## Northwest Airlines Flight 293

**IN THE HISTORY** of unsolved aviation accidents, the shroud of mystery has most often been the water that covers nearly three-quarters of Earth's surface. That was the case for a Northwest Airlines DC-7C carrying six crew members and 95 passengers on June 3, 1963. Flight 293 was a charter, transporting members of the mil-

**The evidence that could explain what caused this Northwest Airlines DC-7C to crash on June 3, 1963, lies at the bottom of the Gulf of Alaska.**





## Southern Airways Flight 932

**ON THE CAMPUS** of Marshall University in Huntington, West Virginia, a prominent building is the Memorial Student Center. It commemorates the evening of November 14, 1970, when the school lost most of its football team in an airplane crash at nearby Tri-State Airport. With two pilots and two flight attendants, Southern Airways Flight 932 was a charter for the school, returning 71 team members, coaches, university staff, and officials from a game in Greenville, North Carolina, where Marshall had lost to East Carolina University, 17 to 14. Mist and light rain restricted visibility in the Huntington area as the pilots were attempting to land. One mile short of the runway, the McDonnell Douglas DC-9 struck trees, then crashed and burned, killing all on board. (The accident and its aftermath are the subject of the 2006 film *We Are Marshall*.)

Some airport instrument landing systems are equipped with both a localizer antenna array, which provides inbound aircraft with lateral guidance, and a glide slope for vertical guidance. Pilots flying a precision approach follow the glide slope to the touchdown point. But like many airports, Tri-State had only the localizer



© BETTMANN/CORBIS

(following the accident, a glide slope was installed at the airport). Without a glide slope, pilots fly a non-precision approach, which requires them to stay above a designated minimum descent altitude until the runway is in sight. An individual MDA for approaching each runway, based on terrain and other considerations, is established and published. In its investigation, the NTSB determined that the DC-9 was flying below the MDA, but the board could not establish why.

Commercial aircraft are customarily equipped with several altimeters, both

barometric and radio. According to the NTSB, the barometric altimeter might have been malfunctioning or the pilots might have been relying too much on the radio altimeter in an area of uneven terrain. The crash would likely have been averted if the cockpit had been equipped with a Ground Proximity Warning System, which is now required in all airliners in the United States.

**Marshall University's football team perished in a fiery crash outside of Huntington, West Virginia.**

## Aer Lingus Flight 712

**AER LINGUS FLIGHT 712** was to be a short trip, covering the 361 miles from Cork, Ireland, to London's Heathrow Airport. The Vickers Viscount, named *St Phelim*, took off the morning of March 24, 1968. Less than 45 minutes later, it went down in the Irish Sea. All 57 passengers and a crew of four were lost.

The four-engine turboprop had reached 17,000 feet in a clear sky, yet soon after, as the pilots reported in their final radio contact, it was at "12,000 feet, descending, spinning rapidly." The crew managed to regain control and fly for about 10 minutes before the dive into the sea.

Only 14 bodies were recovered. The *St Phelim* carried no recorders, and even though the main debris field was only six miles from the Irish coast, much of

the wreckage was either unrecovered or damaged further during salvage. Still, analysis of that wreckage enabled Irish government investigators to rule out engine failure or some type of explosion. Something had happened to impair the Viscount's pitch control, but investigators could not determine what it was.

But that was hardly the end of the case. Among numerous accident scenarios, the investigation had considered the possibility that something man-made flew close to the *St Phelim* or even struck its tail. The report called this nothing more than a "remote possibility," but indicated that it did constitute a "coherent" hypothesis for explaining all the evidence, including eyewitness statements. Decades of speculation and

conspiracy theories followed, with chief suspicion focused on the British military. In one account, the airliner was downed by an errant missile, fired from a base on the west coast of Wales or from a warship. Another explanation blamed a drone aircraft.

Following the 30th anniversary of the accident, families of the victims organized and called for a fresh inquiry. The Irish government agreed, and established a new review team, including investigators from France and Australia. Their 2002 report dismissed suggestions of a missile strike or other such encounter and pointed instead to a failure in the left horizontal stabilizer and elevator. The report cited metal fatigue, corrosion, control surface vibration, and bird strike as possible causes.



## South African Airways Flight 295

**SOUTH AFRICAN AIRWAYS'** *Helderberg* was a Boeing 747 Combi, an airliner whose main deck could be partitioned to carry both passengers and cargo. On November 28, 1987, the *Helderberg* was carrying 140 passengers, 19 crew members, and six pallets of cargo on a flight from Taipei, Taiwan, to Mauritius and then on to Johannesburg, South Africa. Less than an hour before the estimated arrival in Mauritius, Flight 295 reported smoke in the aircraft. Controllers could hear the pilots struggling with the emergency before communications went out. The *Helderberg* crashed in the Indian Ocean. No one survived.

Search aircraft and vessels retrieved a small amount of floating wreckage and human remains, but most of the debris settled at the bottom of the ocean. More than a year after the accident, a deep-sea salvage operation retrieved the cockpit voice recorder and a substantial quantity of wreckage. The recorder tape provided some information, primarily showing how rapidly the aircraft's systems were compromised, but it was not as revealing as hoped. South African investigators concluded that fire had broken out in the *Helderberg's*

right forward cargo pallet and been fed by plastic and cardboard packing materials, but the ignition source remained unknown.

The *Helderberg* disaster was controversial because of the apartheid policy of the government that owned the airline. Initial supposition was that Flight 295 was the victim of anti-apartheid sabotage. But when the government's own investigation found no evidence of explosion, suspicions shifted. Conspiracy theories to this day hold that the *Helderberg* carried

dangerous cargo not listed on the manifest, and that the government of the time was using commercial aircraft such as the 747 to circumvent the international arms embargo against the white-controlled regime.

**Reconstruction of a South African Airways Boeing 747 has failed to reveal what started an onboard fire, which led to the loss of 19 crew members and 140 passengers.**



## Payne Stewart Learjet 35

**ALL AIRCRAFT ACCIDENTS** are terrifying, but the story of the last flight of professional golf champion Payne Stewart has an added element of strangeness. It was an incident that unfolded over nearly four hours and 1,500 miles. Stewart, known for competing in the colorful golfer attire of an earlier era, had won the U.S. Open for the second time four months

before he boarded a Learjet 35 on October 25, 1999. He, two agents who represented him, and a golf course designer were flying from Orlando, Florida, to Dallas, Texas.

The flight had a two-pilot crew, and for eight minutes after takeoff, their radio messages were routine. But when communications suddenly ceased and the aircraft began to veer off course, military aircraft were dispatched to intercept. F-16 pilots found the jet with opaque cockpit windows, dark interior, and unmoving flight controls. With the autopilot apparently

following an unchanging course, the ghost ship cruised above 46,000 feet until it exhausted its fuel and spiralled into a South Dakota field. The jet hit the ground at a steep angle and near-supersonic speed, shattering at impact.

From the start, the Learjet's performance, the frosted windows, and the crew's unresponsiveness made clear what led to the crash: crew incapacitation from hypoxia, stemming from cabin pressure loss. What could not be determined is why the cabin lost pressure. Also unknown is whether the pilots were using the aircraft's supplemental oxygen, and if so, why it failed to keep them conscious long enough to act. Unfortunately, the aircraft carried no flight data recorder, and its cockpit voice recorder could capture only the last 30 minutes of the flight. ✈

**Golfer Payne Stewart never made it to his destination in Texas after his chartered Learjet (similar to the one at left) mysteriously lost pressure.**







# ONE MORE FOR THE CHECKLIST



**FOR SOME PILOTS, A GOOD-LUCK CHARM IS  
STANDARD EQUIPMENT. BY MICHAEL KLESIOUS**

**A homemade gremlin was lucky for a B-17 crew in World War II; other crews have relied on cards and coins. Opposite: In 2006, former President George H.W. Bush, namesake of the Navy's newest carrier, and Captain Kevin O'Flaherty place their naval aviator wings under the ship's island for good luck.**

**FROM HIS TOUR** in an Air Force-Navy exchange program, retired U.S. Air Force fighter pilot Ralph Wetterhahn remembers a Navy pilot who had an odd practice. It was during the Vietnam War, and they both flew A-7 Corsairs from the carrier *USS America*. Wetterhahn can't remember the pilot's name; what he does remember is that every time the guy flew a mission, he would take along a small, rubber Snoopy doll. "Snoopy's mostly a white dog, right?" says Wetterhahn, an *Air & Space/Smithsonian* contributor. "Well, that damn thing was filthy from grease and so on in the airplane. He'd jam it into the notch between the panel and the windscreen."

One day, as the pilot prepared to launch, he realized he'd forgotten Snoopy. "The guy went bananas," Wetterhahn recalls. "He got on the radio and insisted his roommate go downstairs and find it. He wouldn't take that catapult shot without it." Having flown aircraft for both services, including F-4s and F-15s for the Air Force, Wetterhahn guesses that naval aviators as a group might be a bit more superstitious.

"I suspect the Navy guys had more to worry about, with cat shots and arresting gear, et cetera."

Maybe. But a few decades ago, Bill Wallrich, who served in the Army in World War II and Korea, wrote an article, "Superstition and the Air Force," for the journal *Western Folklore*. "The United States Air Force, although it has been in existence but a short half century, has developed a vast and definite folklore peculiarly its own," Wallrich wrote. Within that folklore, he explained, could be found a specialized vocabulary of slang and argot, sayings and jokes, legends and tall tales, songs and ballads, heroes and buffoons. And yes, superstitions.

As I interviewed pilots for this article, a mysterious pattern emerged. Many denied being superstitious, then quickly followed with "...but I can tell you about a pilot who *is*." Perhaps superstition is in the eye of the beholder. But Wetterhahn makes a point about carrier aviation that could also apply in other circumstances: "You get a cold cat shot, and you don't really have any control over that."



Control. Superstitions emerge as mental hedges against danger in situations where so much is beyond a person's control. With pilots frequently in those situations, a rich lore of flying superstitions has accumulated. Military aviation, especially in wartime, has been the most fertile ground.

Consider P-38 Lightning pilot Carl Mills, who flew in Italy for the U.S. Army Air Forces in World War II. Fellow P-38 pilot Dave Toomey remembers Mills as a top-notch flier, "but he wasn't too keen about having his picture taken. It was sort of against his principle." One day, Mills grudgingly allowed himself to be photographed just before a mission. "Then he went out and flew the mission, and wouldn't you know he got his ass all shot up," says Toomey. "Barely made it back on one engine. After that, if someone ever took a picture of him, he wouldn't fly that day. I made the mistake of snapping his picture once, and he saw me do it and he really came at me. It took two guys to hold him back. He was rabid."

During World War II, says Wallrich, the stress on pilots frequently produced superstitious behavior. The most common was the carrying of amulets and talismans like silver dollars, particularly (and counter-intuitively) when the numbers in the year added up to 13 (such as 1921), to correspond with that coin's 13 stars and its eagle's 13 tail feathers. Every unit had at least one bad-luck airplane—a "clinker," in Wallrich's words, whose temperamental behavior masked a darker jinx—and a charmed airplane that padded the odds for any pilot lucky enough to fly it.

Many airplanes flew with the name "Boomerang," a reassuring omen for the crews because a boomerang always returns to where its flight began. The crew of the B-29 *Boomerang*, which flew 10 missions before its final one on August 15, 1945—the last bombing raid over Tokyo—carried a real boomerang on board, and all made it home safely.

In Vietnam, when Air Force pilot Dan Cherry flew



RIGHT: NASM NEGATIVE 90-188; BOTTOM RIGHT: ISTOCKPHOTO

combat missions in the F-105 and the F-4, he always wore a red bandana around his neck. "Definitely a good-luck charm," he says today. "My mustache also served that purpose. The mustache was started the day before my first combat mission and not shaved off until putting feet down in the good ole USA after completing the tour. I wouldn't dream of shaving it off...no matter how ugly it looked."

**Having the right nose art, like this popular 1940s cartoon character on a B-24H, was thought to bring good fortune.**

**"Just before takeoff, he'd flick [the cigarette] out the window, close it, and push the throttles up," says Steve Dunn. "And that made you feel like 'We're on our way.' If he didn't do that, we all felt awkward. We wanted him to smoke his cigarette."**

Among the superstitious, the consensus seems to be: If it works, don't mess with it. Before his present gig with the Federal Aviation Administration in Spokane, Washington, Steve Dunn made a career of flying DC-3s for Hollywood and wide-bodies for the airlines. Dunn remembers flying with a DC-10 captain for Hawaiian Airlines. Whenever the big jet taxied to the runway, the captain would crack his cockpit window and, in flagrant violation of procedures, light a cigarette. Dunn and the other officer, meanwhile, would run through the checklist. "Just before takeoff, he'd flick [the cigarette] out the window, close it, and push the throttles up," says Dunn. "And that made you feel like 'Here we go boys, we're on our way.'" Dunn recalls that the rest of the crew



US NAVY/MASS COMM SPECIALIST 2ND CLASS RJ STRATCHKO





LEFT: COURTESY DARIN MAURER; BELOW LEFT: COURTESY AMY COSOLA



**Carl Schahrer, commander of the B-29 Boomerang, shows off the talisman (inset), on which his crew carved their missions. Right: On a B-1B, a four-leaf clover trumps an unlucky number.**

didn't want the captain involved in the checklist; they wanted him to do his ritual. "If he didn't do that, we all felt awkward. We wanted him to smoke his cigarette." He adds: "As young pilots, we felt that the plane respected him. If he was on board and did his routine, the plane would follow."

Race pilots have a double whammy: They fly in hazardous conditions and can't control the actions of other pilots in the event, and, like others involved in high-stakes sports, they are inclined to believe that luck plays a role. John Penney is known for dusting the competition in recent years at the Reno National Championship Air Races in the modified Grumman F8F-2 Bearcat *Rare Bear*. Penny's superstitions started in Vietnam, when he flew combat missions in an A-7D Corsair out of Thailand. "A bunch of us had custom flying boots made by a mer-

**Race pilots have a double whammy: They fly in hazardous conditions and can't control the actions of other pilots in the event, and, like others involved in high-stakes sports, they are inclined to believe that luck plays a role.**

chant in downtown Korat, the 'Good Luck Boot Shop.' I wore mine on every combat mission and never took a hit from anti-aircraft guns, surface-to-air missiles, and such. That is not to say that wearing those boots necessarily brought me good luck and protected me from harm. However..." Years later, he says, when he started racing *Rare Bear*, his best wins and speed records, as well as his safest emergency landings, all happened when he was in those "Good Luck" boots. Last year he finished second in *Rare Bear*, behind a Strega flown by Steve Hinton Jr. On Penney's feet that day were a brand of NASCAR/Indy racing shoes. "Enough of that," he says. "This year my 'Good Luck' boots are going back on the race course."

Superstition has even found its way into NASA, which has always selected its pilots from the military services. Space shuttle astronaut Robert "Hoot" Gibson, an ex-Navy fighter pilot, recalls that on launch day, the schedule gives the crew about 15 minutes between suiting up and heading to the pad. During that period, the astronauts would stand around a high table in the suit-up area, joined by the Chief of the Astronaut Office and the Director of Flight Operations. A deck of cards would appear, and they would play a homegrown game called Possum Fargo. Five-card hands were dealt. No betting, no further cards. Just a rapid deal. Whoever had the lowest hand won the round.

"It's like poker, 180 degrees out," says Gibson. "The lowest you could get was 2,3,4,5,7 [a 6 gave you a straight]. That was the winningest hand." The crew could not leave until the commander of the mission won a hand—for good luck. "You were not ready to walk out of there until he won," says Gibson. He doesn't know who created the game or who named it. But he played it on every one of his five missions.

Four-time shuttle astronaut Tom Jones has a slightly different recollection of Possum Fargo. "We watched the commander play the card game in the suit-up room against the chief of the Flight Crew Operations Directorate," says Jones. "Rest of the crew does not



USAF

play, and I don't know the game. My opinion is that the kind of people I crewed with did not get there by being superstitious, so it's a trait bred out of the astronaut corps for the most part." But he admits that the commander had to get that low hand before launch. "Once you lose, you can go out to the pad," says Jones. Or win, he means, with that lousy hand.

As a magazine reporter, I'm not sure what to make of such superstitions. I'm not superstitious myself, but I once knew this copy editor.... ➔





# CASE CLOSED

MYSTERIES SOLVED, SECRETS REVEALED, AND QUESTIONS FINALLY ANSWERED.

## Who's Afraid of the Bermuda Triangle?

The islands of Bermuda beckon to passengers on a Lockheed C-121C Super Constellation in 1956. There may have been some nervousness in the cabin. Today most travelers don't give flying into the Bermuda Triangle a second thought.

**NOT LONG AFTER WORLD WAR II**, a heavily trafficked patch of the Atlantic Ocean began gaining a reputation as a place to avoid: A number of airplanes and ships had vanished after entering a triangular area, its three points in Miami, Puerto Rico, and Bermuda.

One of the more famous disappearances happened on December 5, 1945, when five U.S. Navy TBM Avengers on a training mission were lost. The compass of the lead airplane malfunctioned, and all the airplanes probably ran out of fuel. One of the search-and-rescue aircraft, a PBM-5 Mariner, also disappeared; the Navy chalked it up to a mid-air explosion. In the late 1940s, several commercial flights, including a Douglas DC-3 and an Avro Tudor IV, vanished as well, causing the public to wonder what was going on in the area that became known later as the Bermuda Triangle. (The term was coined in a 1964 article in a U.S. pulp magazine.)

"People were scared in that whole cold war era. They didn't expect airplanes to go missing," says Dorothy Cochrane, an aeronautics curator at the National Air

and Space Museum. "You had a lack of communications technology, and meteorological science wasn't all that great. So it gave rise to all these theories."

It wasn't long before magazines like *Fate* and *Argosy* put a supernatural spin on the disappearances, and the Triangle became topic A for fans of the paranormal.

For serious thinkers, the case of the spooky Triangle has been closed since Larry Kusche wrote his landmark 1975 book *The Bermuda Triangle Mystery: Solved*. Today, hurricanes, human error, and compass variations and deviations are only a few of the culprits that cause the Navy and the Coast Guard to conclude that no more airplanes and ships are lost there than in other regions of the world with similar climate and shipping or air traffic. Oh, and the purported releases of methane from the sea floor that turn the surface into a ship-swallowing froth? Some people believe it. The Skeptic's Dictionary Web site ([skepdic.com](http://skepdic.com)) calls it "oceanic flatulence."

MICHAEL KLESIOUS

KENNETH MILLER



## Roswell: A Hotbed of Conspiracy Theories



**WHICH INCIDENT OF** the 20th century is responsible for more analysis, rehashings, and conspiracy theories: the Kennedy assassination or the Roswell incident? Each left in its wake copious details that are difficult to interpret. Decades later, amateur scholars pore over them with a level of attention that is almost molecular.

**Extraterrestrials are a cottage industry in Roswell, New Mexico, where even the road signs hype the 1940s UFO case.**

On June 14, 1947, rancher Mac Brazel found scraps of rubber, paper, tin foil, and sticks in a field north of Roswell, New Mexico. On July 8, the Roswell Army Air Field issued a press release announcing that military personnel had discovered the remains of a “flying disc.” But later that day: Recall. The debris hadn’t come from a flying saucer, said Eighth Air Force Commanding General Roger Ramey, but from a weather balloon. It wasn’t enough. Over the decades, the story grew to include aliens in the saucer, secret autopsies of the aliens, autopsy witnesses disappearing....

In 1994, Congressman Steven Schiff of New Mex-

ico, after repeated inquiries from his constituents, commissioned a General Accounting Office study to try to hash it all out. The conclusion: The culprit was Project Mogul, a then-secret program in which balloons sent up to 40,000 feet used sonobuoys to listen for evidence of Soviet nuclear tests. The explanation got a boost in 1997 from the book *UFO Crash at Roswell: Genesis of a Modern Myth* (Smithsonian Institution Press); in it, Mogul scientist Charles Moore lays out detailed weather data he says shows how one balloon could have left the debris.

The Mogul explanation isn’t universally satisfying. Saucerologist David Rudiak claims Moore cooked his meteorology. (Moore, who died in March, would not debate Rudiak’s challenges.) Rudiak also examined a photograph of General Ramey taken the day he issued his saucer denial: Ramey holds a piece of paper, and Rudiak, having blown the picture up, insists the paper bears the words “victims of the wreck.” The GAO counters that a “national level organization” examining the photo found nothing of the kind, and that Roswell is, and always has been, a saucer-free zone.

PERRY TURNER



LEFT: COURTESY RCA; MIDDLE AND RIGHT: NASA/GODDARD

## One Giant Oops for Mankind

**IN 1999, JOHN SARKISSIAN**, a scientist at the Parkes Radio Observatory in Australia, began hunting for original Apollo 11 recordings of the TV signal beamed from the moon during Neil Armstrong’s historic “step” on July 20, 1969. Sarkissian, who worked as a technical advisor on *The Dish*, a movie about Parkes’ role in the mission, knew that the ghostly black-and-white film seen by hundreds of millions on that momentous day wasn’t what was transmitted from the moon. Only a handful of people at Parkes and two other tracking stations, Goldstone in California and Honeyuckle Creek in Aus-

tralia, saw that. The rest of us saw a degraded picture that had been converted to a format commonly used by broadcasters of the day.

So what happened to the original, clear TV pictures? They were recorded on one-inch magnetic tapes and sent to NASA’s Goddard Space Flight Center in Greenbelt, Maryland. But after more than a decade of searching by Sarkissian, Richard Nafzger of Goddard, and half a dozen others at various U.S. and Australian institutions, nobody has been able to put their hands on the tapes.

The most likely conclusion, NASA determined last

**NASA last year restored archival film of the Apollo 11 moon landing. At left: A master erase head.**



July, is that it recorded over them in 1981, when a shortage of one-inch magnetic tapes led the space agency to reuse old ones in storage.

More than once, the search team thought they had located dubs of the original TV recordings. In one case, it was a tape stored for 36 years in the garage of a retired employee of the Australian Honeysuckle tracking station. All that time he had thought it was the Apollo 11 moonwalk, but it turned out to be simulation data from 1967.

There are no villains in this story. What looks in hindsight like a colossal blunder has a simple hu-

man explanation: No one in the 1970s, when the tapes were being stored at various archives, flagged them as being especially valuable. After all, the viewing public had seen the broadcast signals as the government had planned, and there was no digital technology yet to convert the original telemetry tapes to usable pictures. Still, NASA last year arranged for the broadcast-quality tapes to be digitally enhanced to improve the scenes we saw all those years ago. The space agency released the tapes as the nation marked the 40th anniversary of the moonwalk.

TONY REICHHARDT

## The Lady That Didn't Come Home

**HAD IT NOT BEEN** for some sharp-eyed British oil exploration engineers in Libya in May 1958, a B-24D Liberator named *Lady Be Good* might have joined the ranks of other military aircraft that went permanently MIA during World War II. Instead, the

discovered its radio still worked, as did one of its .50 caliber machine guns. The airplane lay just 16 miles south of where the crew had landed. Had they trekked south, instead of northwest, they would have found life-saving water, food, and communications equipment aboard the *Lady*. (They had no way of knowing their base was actually 440 miles away; the last man made it an astounding 111 miles before collapsing.)

The discovery of the bomber and crew triggered worldwide media coverage. At least two books were written, along with numerous newspaper and magazine articles, and a 1960 episode of "The Twilight Zone" ("King Nine Will Not Return") was loosely based on the incident. Over the years, the B-24 was stripped of most of its parts and the crew's belongings; some items went to various U.S. Air Force and Army museums. What remained of the airplane, the Libyan government removed from the desert in 1994 and stored at the El Adem military airfield in Tobruk.

Why did the *Lady* get lost? The official investigation report blames the rookie navigator, saying he misinterpreted a directional reading sent from Benina airfield in Libya. But Mario Martinez, author of *Lady's Men: The Story of World War II's Mystery Bomber and Her Crew*, points to a different reason: failure by another radio operator at nearby Benghazi to respond to the bomber pilot's plea for a position report, believing the airplane to be German. "Failure to acknowledge this call was probably the reason the *Lady Be Good* flew on and disappeared," Martinez writes on his Web site, [ladybegood.com](http://ladybegood.com).

Bombers from World War II still turn up today, mostly in the Pacific. "There are hundreds of crash sites in places like Papua New Guinea, with full skeletal aircraft remains plus crew remains, because culturally they [Papuan] do not touch sites like that, [mindful of] the aura of death," says Larry Greer, a spokesman for the Defense Prisoner of War/Missing Personnel Office in Arlington, Virginia.

PAUL HOVERSTEN



aerial survey team from D'Arcy Oil Company (later British Petroleum) inadvertently found the *Lady* after a 15-year disappearance, making it one of the most famous aircraft to ever

**Was it a navigational error by the crew (above) or a mistake by a radio operator that made this B-24 lose its way?**

lose its way home in that war.

In the early hours of April 5, 1943, the airplane was returning from a night bombing run over Italy when it overshot its base at Soluch, on the Libyan coast, and ran out of fuel. The crew parachuted into impossible odds: Eight men (a ninth was killed when his parachute failed to open) and half a canteen of water in the Libyan desert, where temperatures reached 130 degrees Fahrenheit. But the wreckage, first examined in 1959, showed the men could have survived had they not made a fatal mistake.

When ground teams first inspected the *Lady*, they



## Mercury Unmasked

**A NASA SPACECRAFT** is stripping away some of the mystery that has shrouded Mercury for decades. For starters, planetary scientists finally know what the solar system's innermost planet looks like, thanks to a probe known as MESSENGER (for MErcury Surface, Space ENvironment, GEochemistry, and Ranging).

From two flybys in 2008 and a third last fall, scientists now have a map of 98 percent of the planet (only the poles are missing). The last mission to Mercury—three passes by Mariner 10

**MESSENGER last year revealed another side of Mercury, color-enhanced to show the differences in surface geology.**

in 1974 and 1975—was able to photograph only about 45 percent. “The fact that more than half the planet had never been seen is now history,” says Sean Solomon, MESSENGER's principal investigator and a planetary scientist at the Carnegie Institution in Washington, D.C.

MESSENGER also settled a 30-year debate over whether Mercury—with a molten iron core, like Earth—has volcanoes: It does, plenty of them. At least 40 percent of the surface consists of smooth plains, most of which are ancient lava flows. When Mariner 10 flew past, it “didn't see any clear evidence of volcanoes,” says Solomon.

Another surprise is that MESSENGER



**Mariner 10 sent back this mosaic in 1974, but left many questions unanswered.**

did not see a highly magnetized crust, though Mercury's core generates a global magnetic field. Mercury and Earth are the only planets that have such fields (Mars once had one). Mercury's is much weaker than Earth's, but studying its geometry and origin—along with the planet's surface features and composition—“offers a window into the processes of planet formation that led to our Earth but with a different mix of processes and a very different final planet,” says Solomon.

In March the spacecraft begins a year-long orbit of Mercury, and it may be able to solve one of the planet's biggest unknowns: whether water ice exists on the floors of its dark polar craters. “That mystery has been with us for 18 years, since radar astronomers discovered those floors,” says Solomon. Though Mercury is one of the hottest planets, with daytime temperatures that reach 800 degrees Fahrenheit, its poles could harbor water ice: Because the planet is not tilted on its axis, its poles stay at a constant –350 degrees. The radar analysis suggests that the ice is clean of impurities, indicating it might have come from comets millions of years ago.

PAUL HOVERSTEN





# HARBOR FREIGHT TOOLS

Quality Tools at Ridiculously Low Prices

## FACTORY DIRECT TO YOU!

How does Harbor Freight Tools sell high quality tools at such ridiculously low prices? We buy direct from the factories who also supply the major brands and sell direct to you. It's just that simple! Come see for yourself at one of our 330 STORES NATIONWIDE and use this 20% OFF Coupon on any of our 7,000 products. We stock Automotive products, Shop Equipment, Hand Tools, Tarps, Compressors, Air & Power Tools, Material Handling, Woodworking Tools, Welders, Tool Boxes, Outdoor Equipment, Generators, and much more.

**NOBODY BEATS OUR QUALITY, SERVICE AND PRICE!**

- ✓ We Have 10 Million Satisfied Customers
- ✓ We Buy Factory Direct and Pass the SAVINGS on to YOU!
- ✓ Shop & Compare Our Quality Brands Against Other National Brands
- ✓ Thousands of People Switch to Harbor Freight Tools Every Day!
- ✓ NO HASSLE RETURN POLICY ✓ Family Owned & Operated

**We Will Beat Any Competitor's Price Within 1 Year Of Purchase!**

**LIFETIME WARRANTY**  
ON ALL HAND TOOLS!

**330 STORES NATIONWIDE**  
Store Locator: 1-800-657-8001

Shop Online at  
**HarborFreight.com**

**SUPER COUPON!** **20% OFF** **ANY SINGLE ITEM!**

Use this coupon to save 20% on any one single item purchased when you shop at a Harbor Freight Tools store. Cannot be used with any other discount or coupon. One coupon per customer. Coupon not valid on any of the following - prior purchases, gift cards, or extended service plans. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in store in order to receive the offer. All Campbell Hausfeld products are excluded from this offer. Valid through 12/19/10.



52307022

**Get More Coupons at HarborFreight.com/airnspace**

**SUPER COUPON!**

**3000 LB. CAPACITY LIGHTWEIGHT ALUMINUM RACING JACK**

**U.S. GENERAL**

Item 91039 shown

LOT NO. 91039/67408

**\$59.99**

REG. PRICE \$99.99

86554276

**HARBOR FREIGHT TOOLS - LIMIT 1**  
This valuable coupon is good anywhere you shop Harbor Freight Tools. Coupon not valid on prior purchases. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in store, with your catalog order form or entered online in order to receive the offer. Valid through 12/19/10.

**SUPER COUPON!**

**CHICAGO welding ELECTRIC systems**

**90 AMP FLUX WIRE WELDER**

Item 98871 shown

NO GAS REQUIRED!

LOT NO. 98871/94056

**\$89.99**

REG. PRICE \$149.99

57777823

**HARBOR FREIGHT TOOLS - LIMIT 1**  
This valuable coupon is good anywhere you shop Harbor Freight Tools. Coupon not valid on prior purchases. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in store, with your catalog order form or entered online in order to receive the offer. Valid through 12/19/10.

**SUPER COUPON!**

**CENTRAL PNEUMATIC®**

**3 GALLON 100 PSI OILLESS PANCAKE AIR COMPRESSOR**

LOT NO. 95275

**\$39.99**

REG. PRICE \$74.99

76668904

**HARBOR FREIGHT TOOLS - LIMIT 1**  
This valuable coupon is good anywhere you shop Harbor Freight Tools. Coupon not valid on prior purchases. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in store, with your catalog order form or entered online in order to receive the offer. Valid through 12/19/10.

**SAVE \$40**

**SUPER COUPON!**

**OSCILLATING MULTIFUNCTION POWER TOOL**

LOT NO. 67256

**\$34.99**

REG. PRICE \$59.99

29011111

**HARBOR FREIGHT TOOLS - LIMIT 1**  
This valuable coupon is good anywhere you shop Harbor Freight Tools. Coupon not valid on prior purchases. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in store, with your catalog order form or entered online in order to receive the offer. Valid through 12/19/10.

**SUPER COUPON!**

**45 WATT SOLAR PANEL KIT**

**SAVE \$100**

LOT NO. 90599

**\$149.99**

REG. PRICE \$249.99

59526673

**HARBOR FREIGHT TOOLS - LIMIT 1**  
This valuable coupon is good anywhere you shop Harbor Freight Tools. Coupon not valid on prior purchases. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in store, with your catalog order form or entered online in order to receive the offer. Valid through 12/19/10.

**SUPER COUPON!**

**RECIPROCATING SAW WITH ROTATING HANDLE**

LOT NO. 65570

**\$19.99**

REG. PRICE \$39.99

60604410

**HARBOR FREIGHT TOOLS - LIMIT 1**  
This valuable coupon is good anywhere you shop Harbor Freight Tools. Coupon not valid on prior purchases. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in store, with your catalog order form or entered online in order to receive the offer. Valid through 12/19/10.

**CHICAGO ElectricPower Tools**

**17 DIFFERENT ATTACHMENTS AVAILABLE IN OUR STORES!**

**CUT METAL** **CUT DRYWALL** **CUT PLASTIC** **PLUNGE CUTTING** **CUT FLOORING**

**SAVE 41%**

29011111

**HARBOR FREIGHT TOOLS - LIMIT 1**  
This valuable coupon is good anywhere you shop Harbor Freight Tools. Coupon not valid on prior purchases. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in store, with your catalog order form or entered online in order to receive the offer. Valid through 12/19/10.

**SUPER COUPON!**

**6" DIGITAL CALIPER**

**CEN-TECH®**

Item 47257 shown

Includes two 1.5V button cell batteries.

LOT NO. 47257/98563

**\$9.99**

REG. PRICE \$29.99

64631179

**HARBOR FREIGHT TOOLS - LIMIT 1**  
This valuable coupon is good anywhere you shop Harbor Freight Tools. Coupon not valid on prior purchases. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in store, with your catalog order form or entered online in order to receive the offer. Valid through 12/19/10.

**SUPER COUPON!**

**HAUL-MASTER®**

**500 LB. CAPACITY ALUMINUM CARGO CARRIER**

LOT NO. 92655

**\$59.99**

REG. PRICE \$109.99

79434338

**HARBOR FREIGHT TOOLS - LIMIT 1**  
This valuable coupon is good anywhere you shop Harbor Freight Tools. Coupon not valid on prior purchases. Coupon cannot be bought, sold, or transferred. Original coupon must be presented in store, with your catalog order form or entered online in order to receive the offer. Valid through 12/19/10.

**SAVE UP TO 80% TODAY - SHOP ONLINE at HarborFreight.com**

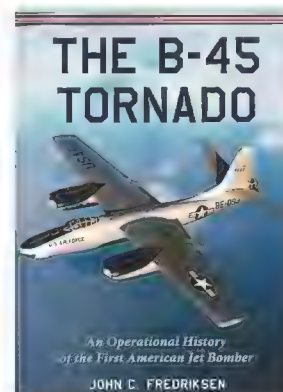
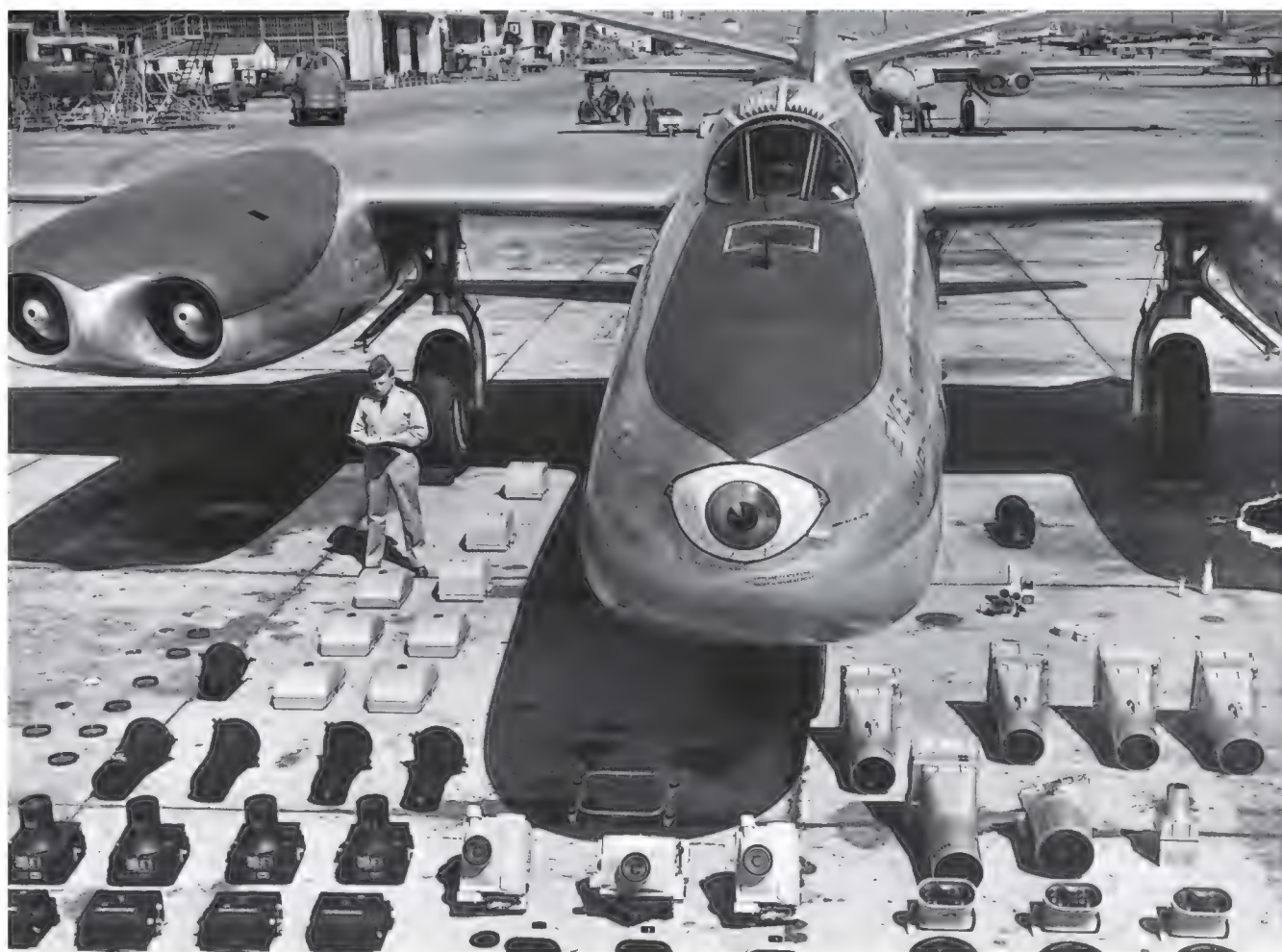


# Reviews & Previews

BOOKS, MOVIES, CDs, STUFF TO BUY

## The Watchman

A new book shows that North American's B-45 Tornado was a decent jet-powered bomber – and an even better cold war spyplane.



The Tornado earned its keep as a reconnaissance aircraft during the Korean War. Left: An RB-45 could carry a range of cameras and film in its eyeball-painted nose.

### *The B-45 Tornado: An Operational History of the First American Jet Bomber*

by John C. Fredriksen. McFarland, 2009. 264 pp., \$45.


**THE NORTH AMERICAN B-45** was the Rodney Dangerfield of cold war aircraft, robbed of respect by the more modern Boeing B-47. Both aircraft resulted from a 1944 competition to build the first U.S. jet bomber. North American took an early lead with a design similar to the bombers already in combat: straight wings, squared-off wingtips and tail feathers, and engines faired into the wings. Those engines

gave the generals the speed they had hoped for. The B-45 was so fast—560 mph—that serious thought was given to adapting it as an all-weather interceptor.

As a rule, operational histories are fodder for obsessives and modelers, not the general reader, but John Fredriksen has managed to search out and interview seemingly everyone who ever served on a B-45. Their quotes serve as wonderful spice to his story. “Hell, we were all fired up,” says Sergeant Terry Little of his introduction to the aircraft. “It was an honor to work on it, but it was a bugger to maintain.”

In the end, the B-45 proved most

valuable as a spyplane, overflying the Soviet Union and China. Serving in the Korean War, it was also the first U.S. multi-engine jet to see combat. And on November 1, 1951, a B-45C with the U.S. Air Force’s 4925th Test Group (Atomic) dropped a live nuclear bomb in the Nevada desert. That it served on the frontline for 10 years, while the kinks were removed from the swept-wing B-47, is a reminder that it’s not a bad idea to keep a second-best arrow in your quiver.

 DANIEL FORD RECENTLY COMPLETED HIS MASTER’S THESIS, ON THE COUNTER-GUERRILLA IDEAS OF U.S. AIR FORCE COLONEL JOHN BOYD.

TO ORDER THESE BOOKS FROM SMITHSONIAN SHOPS, CALL (202) 357-1387 OR -1388.



## For the Love of Flying: The Story of the Laurentian Air Services

by Danielle Metcalfe-Chenail. Robin Brass Studio, 2009. 224 pp., \$34.95.

**EVERY RECREATIONAL AVIATOR** has a fantasy playbook. Typically, one part of the adventure has something to do with getting a seaplane rating and helping others to discover an unexplored wilderness to which only you, as bush pilot, would provide access.

For those curious about the nuts and bolts of bush flying, I'd recommend Danielle Metcalfe-Chenail's *For the Love of Flying*, a chronicle of the origin, people, and places of a charter air operation in eastern Canada. The book describes the challenges faced by aviators flying in the back country. Bush pilot John Gill has operated a de Havilland Beaver to supply mining camps with food, gas, and men, and he recounts one of the cold-weather rituals: "If it was going to be a very cold night, even having the [Herman-Nelson engine] heater in the morning would not be good enough. We would have to remove the battery into our hut, to give it a little extra protection. We also diluted the engine oil with gasoline to

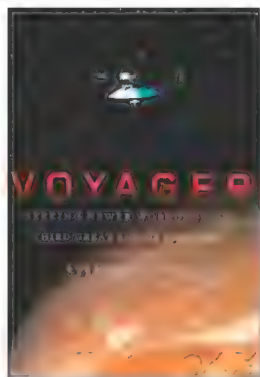
make it thinner. This protects the engine on cold morning starts. Once in the air, the engine warmed quickly, and the gas would vaporise off from the oil and all would be normal."

Begun as a family-history project, the book developed into a beautifully illustrated account of a well-known aviation business. Brochures, advertisements, articles, and sidebars about flying in the wet wilderness are scattered among contemporary and historic photographs, and all of it gives *For the Love of Flying* the ability to transport readers on journeys to the outer reaches of the civilized world.

**BOB MCLEAN'S DAY JOB IS AIRCRAFT RESTORATION. HE OCCASIONALLY FLIES LIGHT AIRPLANES, AND HAS ONCE RIDDEN IN THE BACK SEAT OF A SEAPLANE, BUT WITHOUT THE EXPERIENCE OF A WATER LANDING.**

## Voyager: Seeking Newer Worlds in the Third Great Age of Discovery

by Stephen J. Pyne. Viking Adult, 2010. 464 pp., \$29.95.



**MORE THAN 10 BILLION MILES** away, somewhere in the small constellation Ophiuchus, Voyager 1 speeds away from Earth at more than 37,000 mph. Not quite as fast (about 35,000 mph) and not quite as far (about eight billion miles away), its sister spacecraft, Voyager 2, is traveling in an almost opposite direction toward the constellation Telescopium.

Together with Pioneers 10 and 11, the Voyager spacecraft are among the very few objects to ever leave the solar system. They explored Jupiter and Saturn, and Voyager 2 went on to become the only spacecraft to visit either Uranus or Neptune. As the subject of a new book by Stephen J. Pyne, they are referred to as "the

*Continued on page 73*

### >>> Out of the Vault <<<

## 2001: A Space Odyssey

DVD. Warner Home Video, 2007. Rated G. 141 min., \$26.98.

**MORE THAN 40 YEARS** have passed since Stanley Kubrick unleashed *2001: A Space Odyssey* on a bewildered public. Back in 1968, the *New York Times* called it "somewhere between hypnotic and immensely boring." Initially, the box office take was so meager that after a month in theaters, MGM considered pulling it. But, by word of mouth, the movie, based on the novel by Arthur C. Clarke, grew into a huge hit. Time has proved the critics wrong too: In 1991 the Library of Congress labeled it "culturally, historically, and aesthetically significant." In 2007, the American Film Institute named it the 15th greatest movie of all time.

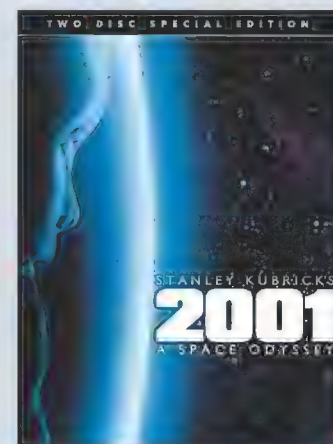
If you've never seen *2001*, I'll summarize the complex plot in three sentences: A few million years ago, early man discovers a black monolith that somehow teaches...well, I shouldn't give that part away. Following a stunning jump-cut, astronauts discover a similar monolith buried on the moon, which broadcasts a single ear-splitting signal toward Jupiter. Eighteen months later a ship arrives at Jupiter to check out the signal, carrying a couple of mission-oblivious astronauts and a psychotic, somnolent-voiced computer named HAL.

And that's when things *really* start getting good.

Today, some of the movie's predictions come across as kind of naive: for instance, that the Bell System and Pan Am would still be around in 2001, and that humans would have built lunar colonies and sent a huge spaceship into Jupiter's orbit, instead of, say, continuing to send a space shuttle around and around Earth. But don't let that sidetrack you. *2001* seems nearly real. That's due to Kubrick's attention to minutiae, from the silence of space (you knew better than that, *Apollo 13*) to the sound of astronauts breathing inside their helmets (Kubrick volunteered his lungs).

There's also the mind-blowing finish that begins when astronaut Dave Bowman says, "Open the pod bay doors, HAL." Once you figure out what follows, to paraphrase HAL, you'll probably need to take a stress pill.

**PHIL SCOTT IS A FREQUENT AIR & SPACE/SMITHSONIAN CONTRIBUTOR.**







LEFT: NASM-SI-92-3996-P; RIGHT: NASM-ZA38566-P



NASM-SI-2001-1902-P



NASM (SI NEG. #SI-A-672)

**From top right, counterclockwise:**  
A TWA Ford Tri-motor is loaded with packages; an Ariane rocket launches from French Guiana; a Gray Rocks Air Service Noorduyv Norseman V bobs on a lake in 1940s Canada; Jimmy Doolittle was a winning air racing pilot in 1931.



## >>> In the Spotlight <<<

### *The Legacy of Flight: Images From the Archives of the Smithsonian National Air and Space Museum*

by David Romanowski and Melissa Keiser. Bunker Hill Publishing, 2010. 278 pp., \$25.

**THE ARCHIVES** of the National Air and Space Museum have more than two million images—one of the Smithsonian Institution's largest collections of photography. David Romanowski, a writer-editor in the Museum's exhibits design division, and Melissa Keiser, the Museum's chief photo archivist, have selected 132 of the most arresting color and black-and-white images for an engaging book that documents the achievements of fliers and aerospace inventors, both the famous and—charmingly—the less well known. There are, for example, photographs of such aviation heavyweights as the Wright brothers, Charles Lindbergh, and Amelia Earhart, as well as astronauts John Glenn, Buzz Aldrin, and Sally Ride. But the book also highlights a Lithuanian glider pilot, a Pan American Airways captain and his flight engineer, and an aircraft spotter standing on a London rooftop while searching the skies for German airplanes.





culmination of a golden age of American planetary exploration.” However, a book focused only on the Voyager spacecraft might not make very enjoyable reading.

Although there is no arguing about the Voyagers’ scientific contributions, the fact is that during most of their journeys, not much happened, and when something did—such as a planetary encounter—the excitement was over within a week or two. Then the spacecraft would go into cruise mode and wait until the next encounter, which would sometimes take years. Pyne brings us along on the Voyager missions and each of their planetary encounters, but he uses the Voyager spacecraft as “preferred vehicles” to tell an even bigger story about exploration and human history. He explains that we are living in the “Third Great Age of Discovery.” The first was the Renaissance; the second, the Enlightenment; Pyne borrows from these other periods in history not only to place the Third Great Age into context, but also to fill the void while the pace of the Voyager mission shifts into cruise mode.

In fact, six chapters are titled “Cruise”; in them, Pyne fills the time with stories about Lewis and Clark, the Apollo missions to the moon, exploring Mars, ancient voyages made by Portuguese explorers, and sometimes even the Voyager spacecraft themselves. Pyne’s knowledge of history and interesting facts is, if not as vast as the solar system itself, extensive. If you’re a history buff, you will love the information packed into this well-written book. However, the constant shifting from one great mission of discovery to the next does not always make *Voyager* easy to read.

■ ■ ■ A FREQUENT CONTRIBUTOR TO *AIR & SPACE*, BOB CRADDOCK IS A GEOLOGIST AT THE NATIONAL AIR AND SPACE MUSEUM’S CENTER FOR EARTH AND PLANETARY STUDIES. HE HAS USED VOYAGER DATA TO CREATE THE FIRST GLOBAL GEOLOGIC MAP OF JUPITER’S MOON IO.

## >>> Model Beauty <<<

**THESE DIE-CAST MODELS** are part of the Smithsonian Museum Replica Series. Available from *Smithsonian Store.com* and in the gift shop of the Steven F. Udvar-Hazy Center in Chantilly, Virginia. To order by phone, call (703) 572-4170.



**F4U Corsair Replica**  
1/48 scale, 10-inch wingspan, \$50.

**F-16 Thunderbird Replica**

1/72 scale, 8 1/4 inches long, \$45.



# ORIGINAL U.S. GOV'T MORGAN SILVER DOLLARS!



Only  
**\$19.90**  
each

**National Collector's Mint announces a special limited release of 3,244 Morgan Silver Dollars 89-132 years old at \$19.90 each. Several prominent national dealers charge from \$10 to \$30 MORE for a comparable Morgan Silver Dollar.** These Morgans are among the last surviving originals still in existence, and each coin is guaranteed to be in mostly Brilliant Uncirculated to Fine condition. Due to volatile fluctuations in the precious metals market, price can be guaranteed @ \$19.90 each for one week only!

You may order one Morgan for \$19.90 plus \$4 s, h & ins., 3 for \$66.70 ppd., 5 for \$109 ppd., 10 for \$212 ppd., 20 for \$417 ppd., 50 for \$1025 ppd., 100 for \$2025 ppd. 30-Day Money Back Guarantee. **CALL NOW!**

**Credit cards & check by telephone accepted, call Toll-Free, Ext. 6364**

**1-866-599-MINT** (1-866-599-6468)  
[www.ncmint.com/6364](http://www.ncmint.com/6364)



National Collector's Mint, Inc. is an independent, private corporation not affiliated with, endorsed, or licensed by the U.S. government or the U.S. Mint. © 2010 NCM AB-AA5



**"GOES ANYWHERE, WRITES EVERYWHERE"**

**WRITES UNDERWATER, UPSIDE DOWN, AND IN EXTREME TEMPS**

**FREE STANDARD SHIPPING**

CHROME #400

BLACK MATE #400B

**ONLY \$22.00**

USE ORDER CODE: **AS810**

**fisher SPACEPEN**

 **MADE IN THE USA**

Developed For **NASA**

 **800 634-3494**

Fisher Space Pen Company  
711 Yucca Street  
Boulder City NV 89005

**FREE**  
**Audio/Video Catalog**



**Just call Crutchfield for the latest in top brand A/V gear.**

- One-on-one expert help to find the right gear for you
- Free shipping on most orders



**For your free A/V catalog or to talk to a Crutchfield expert, call:**  
**1-800-316-1376**  
or [www.crutchfield.com/air](http://www.crutchfield.com/air)

**CRUTCHFIELD**

## Credits

**The Oldest Powered Flying Machine?** Tom D. Crouch is a curator of aeronautics at the National Air and Space Museum.

**The Truth Is Out There.** William B. Scott is co-author of the novel *Counterspace: The Next Hours of World War III*.

**Lost in Space.** Four-time space shuttle astronaut Tom Jones hopes to claim all the lost change rolling around under the orbiter floorboards.

**Cold Case.** Michael Behar regularly contributes to several publications, including *Outside*, *Men's Journal*, and *Wired*.

**Department of Flying Saucers.** Craig Mellow is a freelance journalist in New York who reports frequently from Europe.

**The Curse of the Cargomaster.** John Sotham is a former associate editor at *Air & Space/Smithsonian*.

Further reading: *Remembering an Unsung Giant: The Douglas C-133 Cargomaster and Its People*, Cal Taylor, Firstfleet Publishers, 2007.

**The Force Is With Them.** Sam Kean is the author of *The Disappearing Spoon: And Other True Tales of Madness, Love, and the History of the World from the Periodic Table of the Elements* (Little, Brown, 2010).

**What Made Yuri Fall?** Andrew Osborn is a Moscow-based reporter for Britain's *Daily Telegraph* newspaper.

**The 727 That Vanished.** Tim Wright is a writer living in Richmond, Virginia.

**The Curious Case of Edgar Mix.** Rebecca Maksiel is an *Air & Space* associate editor.

**Cause Unknown.** Lester A. Reingold worked for seven years at the National Transportation Safety Board. He thanks airline historian Robin MacRae Dunn for his contributions to this article.

**One More for the Checklist.** Michael Klesius is an *Air & Space* associate editor.

**Mercury Unmasked.** Paul Hoversten is the executive editor at *Air & Space*.



# Forecast

IN THE WINGS AND ON THE WEB...

## IN THE NEXT ISSUE

### The New Afghan Air Force

Can the U.S. military train Afghanistan's student pilots before troops withdraw?



USAF/STAFF SGT. ANGELITA LAWRENCE

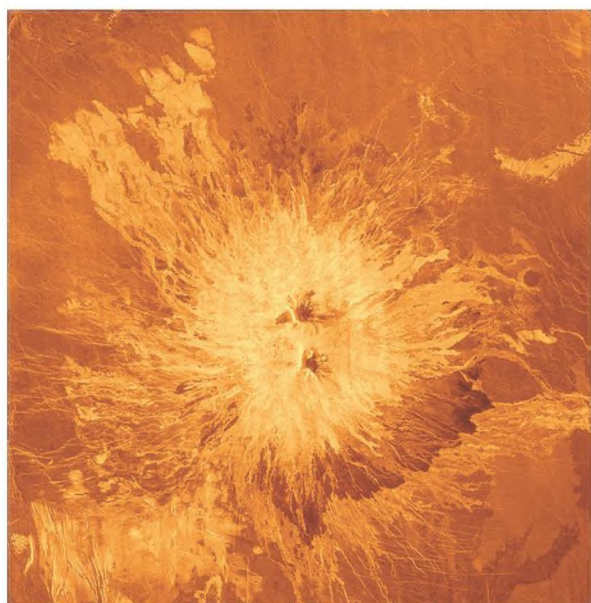
Afghan airmen prepare an Mi-17 helicopter for a training mission at Kandahar.

### Wingnuts

The weird and wonderful world of those who fly without airplanes.

### Meeting Venus

In order to land a probe on Venus in 2017, NASA first has to learn more about the solar system's most hellish spot.



NASA/JPL

Over 243 Earth days – the length of one Venusian day – the spacecraft Magellan mapped 80 percent of Venus, including this volcano.

## WWII Warbird Flights Support the Search for America's 78,000 WWII MIAs



P-51 Mustang

### HISTORY FLIGHT

To Educate. To Honor. To Inspire.

HISTORY FLIGHT IS A 501(c)(3) NON-PROFIT FOUNDATION. ALL FLIGHTS ARE TAX DEDUCTIBLE AND FUND ON-GOING MISSIONS TO BRING OUR MIA SERVICEMEN HOME FROM BURIAL SITES IN REMOTE BATTLEFIELDS OF WWII. VISIT OUR WEBSITE FOR COMPLETE DETAILS ON OUR "LOST GRAVES" MISSION TO TARAWA.

AT-6 Texan



**\$50 off**

ALL 30-MINUTE FLIGHT PACKAGES  
Ask about our 8x10 Gift Certificates suitable for framing

### 'Until They're Home' Tour

now visiting regional airports east of Denver (CO). Five extraordinary flight packages available, some with aerobatics and combat maneuvers. Ask about volunteer ground crew opportunities.



B-25H Bomber

**VISIT HISTORYFLIGHT.COM OR CALL 1.888.743.3311**

## Arabella

America's premier sailing cruises.



atlanticstars.com 800.395.1343

Air & Space/Smithsonian magazine is available on audio tape for members who cannot read standard print due to disability. For the basic membership fee, you will receive a print copy of the magazine plus the audio version. If you or someone you know has been struggling with the standard print version because of vision loss or other disabilities, please contact the Smithsonian Accessibility Program at 1-888-783-0001 and you can receive your next issue of Air & Space on tape.

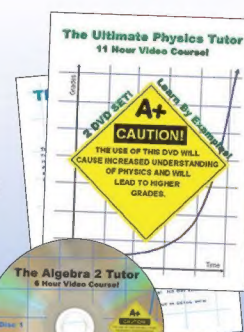
**MATHTUTORDVD.COM**  
Press Play For Success

**Having Math Problems? WE CAN HELP!**

### SUBJECTS:

- Basic Math
- Word Problems
- Pre-Algebra
- Algebra 1 & 2
- Advanced Algebra
- Geometry
- Trig/Pre-Calculus
- Calculus 1, 2, 3
- Physics 1, 2, 3
- Probability & Statistics
- Unit Conversions
- TI Calculator Tutorials

AVERAGE COURSE LENGTH: 8 HOURS  
MOST COURSES COST ONLY \$26.99



Visit [www.MathTutorDVD.com](http://www.MathTutorDVD.com) to watch all courses online 24/7

#1 Rated Math & Physics Tutorial DVDs

Our courses are used in public schools, universities, and libraries!

Raise grades or your money back  
877-MATH-DVD

**www.MathTutorDVD.com**

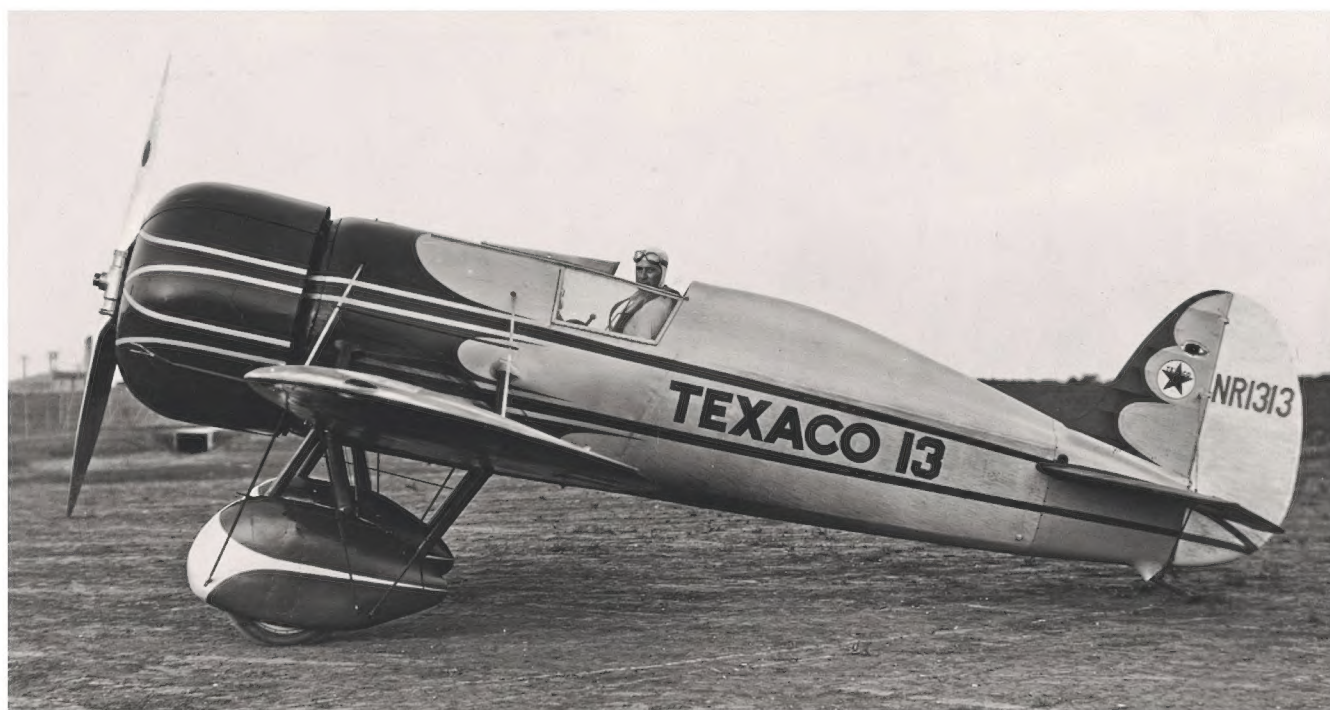


## Travel Air's Mystery Ship

**BACK IN THE 1920s**, the National Air Races were as popular as NASCAR events are today. The race got its start on Long Island but relocated to Cleveland in 1929. That year, a couple of employees of the Travel Air Manufacturing Company in Wichita, Kansas, and its head honcho, Walter Beech, who was one of the founders (Clyde Cessna and Lloyd Stearman were the others), got it in their heads to build a racer that would beat the fast and powerful military pursuit aircraft that dominated competition. But because the factory was running full bore to fill orders for its airplanes, the two race enthusiasts couldn't build a racer on company time.

In 1928, Travel Air delivered more than 400 aircraft, and the following year it became the world's largest manufacturer of commercial monoplanes and biplanes: A workforce of about 1,000, producing at a peak rate of 25 a week, delivered 547. One reason for the impressive sales figures is that aircraft straight out of the factory were making headlines by setting records and winning races. In 1927, a Travel Air 5000 owned by Phillips Petroleum won the Dole Race by flying from Oakland, California, to Wheeler Field in Hawaii.

From the beginning, Herbert Rawdon and Walter Burnham kept their racer project a secret from the public. They named it the R (for Rawdon) and, working nights and weekends, incorporated every new breakthrough in the science of



**The "Texaco 13," the most famous Mystery Ship, set more than 200 speed records in the early 1930s.**

aeronautics. One, developed by the National Advisory Committee for Aeronautics, was a cowl—a shroud around a radial engine that greatly improved cooling airflow and reduced drag.

The airplane's later "Mystery S" moniker, which seems to have come from newspaper stories, reflects how secretive Travel Air was about it, covering it with canvas and hiding it in hangars. It was compact and light, and built around a 400-horsepower Wright Whirlwind engine that may have been tweaked to produce more power. The plywood monoplane wings were thin and braced with wires. The fuselage followed the shape of the cowl; in front of the brief opening for the cockpit was a windshield so small it looked flush with the skin. A turtle deck extended from there to the vertical tail,

constituting a kind of fairing for the helmeted head of the pilot. Enormous wheel pants extended the painstaking effort to reduce drag.

On race day in September 1929, pilot Doug Davis flew the airplane, no longer a mystery but forever after known as the Mystery Ship, in a 50-mile, closed-circuit, pylon race, took the lead, and never looked back. After that, the Travel Air R set a list of records that few have matched since. In a 1971 book on the history of Beech Aircraft commissioned by the company, writer William H. McDaniel quoted a report from an undisclosed source on the airplane's triumphal 20,000-mile tour of the continent: "The old world had justly prided itself on the achievements of its Schneider [Trophy] fliers...but it had not a single machine that could stand long flights day after day with the same engine at speeds above 200 miles per hour." And that was the Mystery Ship's true contribution to aviation.

■ ■ ■ GEORGE C. LARSON, MEMBER, NAA

VISIT THE NAA WEB SITE AT [NAA.AERO](http://NAA.AERO) OR CALL (800) 644-9777.